TEXTILE BULLETIN

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1940 Census of Manufacturers Important To Textile Industry

The 1940 Census of Manufacturers is now being taken, and we urge all of our readers to co-operate with the government in this undertaking. One of the troubles with the textile industry has been the lack of available statistics of all kinds concerning the industry, and any effort to compile useful statistics should have the full backing of every unit. The following article was prepared especially for us by the Department of Commerce.

OPERATORS of textile mills throughout the South and elsewhere, dealers who furnish their materials and equipment and who distribute their products, manufacturers of textile machinery, and growers of cotton, wool, and other raw fibres, will soon know much more about themselves than they have known in many years. For this year, 1940, is the year of the Sixteenth Decennial Census of the United States, the most searchingly thorough inventory ever made of a nation and its human and economic resources. And the textile field is coming in for its share of attention from Uncle Sam's enumerators.

Right now the Census of Manufactures, the Census of Business, and the Census of Mines and Quarries are being taken. To begin in April are the Censuses of Population, Agriculture, Housing, and Drainage Irrigation.

Every textile mill and all other manufacturing enterprises in the country are being enumerated under the Census of Manufactures. Later the Bureau of the Census will publish the statistical facts gathered by its enumerators from owners and operators of cotton mills, rayon and silk plants, dyers and finishers of cotton, rayon and silk; wool and hair goods manufacturers, makers of women's, children's and misses' wearing apparel; makers of men's, youths' and boys' clothing; knitting mills, builders of textile machinery and parts, and so on—to say nothing of some 7,000,000 growers and farmers, 3,000,000 wholesale, retail and other business enterprises, and 132,000,000 individual Americans.

What Did Textile Industry Do in 1939?

How much money did the textile industry invest in new machinery in 1939? What kind of machinery was this? Spinning machines, spindles, pickers, carding machines, roving frames, looms, circular hosiery machines? Or what? How much new land was bought by mills? What was spent for plant expansion? New construction? How many wage earners did the industry support, on an average, over the year? Other employees? What was the total value of textile products made? What were the specific products by quantity and value? What was the cost of materials, fuel, containers, etc.?

What were the totals on these items, say, in North Carolina? Tennessee? Georgia? Elsewhere?

These queries are typical of the things that mill men would like to know. And that's why the U. S. Bureau of the Census, working hand-in-hand with industrial and commercial leaders from all parts of the nation, has included questions on these topics in the 1940 questionnaires, or schedules, for manufacturers.

Special Schedules

Naturally, the questions vary according to each industry. Altogether, some 150 special schedules are being circulated. Nine apply to the industrial group covering "Textile-Mill Products and Other Fiber Manufactures." From these nine, separate statistics will be prepared for 27 different classifications, as follows:

Woolen and worsted (contract factories); hosiery—full fashion; hosiery—seamless; knitted cloths; knitted gloves; knitted outerwear (regular factories); knitted outerwear (contract factories); knitted underwear; dyeing and finishing textiles (except hosiery, woolen and worsted goods); carpets and rugs, wool; carpet yarn, woolen and worsted; carpets, rugs and mats, made from such materials as paper fiber, grass, jute, flax, sisal, cotton, cocoa fiber and rags; linoleum, asphalted-felt-base and other hard-surface floor coverings not elsewhere classified; hat bodies and hats, fur felt; hat bodies and hats, wool felt; hats, straw; hatters' straw; felt goods, wool, hair and jute; lace goods, batting, padding and wadding, upholstery filling; processed waste and recovered wool fibers (regular factories); processed waste and recovered

wool fibers (contract factories); artificial leather; oilcloths; linen goods; jute goods (except felt); and cordage and twine.

In addition, eight special schedules are being used to gather facts on 58 classifications in the group covering "Apparel and Other Finished Products made from Fabrics and Similar Materials." Special schedules are also being supplied to makers of textile machinery, agricultural machinery, tractors, instruments and apparatus, and virtually all other supplies and equipment used in textile production, including industrial air-conditioning units.

Reserve Power Equipment

For the first time since 1930, the industrial schedules carry a query designed to show the nation's reserve of power equipment. Every mill and factory is asked to list the type and horsepower or kilowatt rating of serviceable prime movers, generators, electric motors, etc., either in active use or held for standby. Additional power queries call for the amount of electrical energy generated in plants, amount sold, amount purchased, and quantities, kinds and costs of fuel used.

For the first time in any census details are being collected on expenditures for plant and equipment. Results of this inquiry will indicate, for example, the extent to which the textile group has been "digging in" during the past year. Statistics will show expenditures for new construction or major alterations to plant, buildings, structures and fixed assets such as docks, tracks and the like; expenditures for new machinery and equipment—looms, spinning machines, braiding machines, furniture, typewriters, etc.—and expenditures for such items bought "used," and for real estate acquired in 1939.

Values and Totals of Products

Values and totals of specific products manufactured in 1939 are called for. Form 203, for instance, which covers "Cotton, Rayon and Silk Manufactures and Dyeing and Finishing Textiles," lists approximately 300 items by name, covering cotton woven goods of all kinds, rayon and silk fabrics, yarns spun and thrown, finished thread, bleached and finished goods, and other cotton products such as twine, cordage, tire cord, wadding, fish netting, etc.

Details are sought on some of these items according to manufacture on commission, for sale, or for consumption in own mills. Information is also required on quantity and cost of raw fibers and other materials used, types of machinery used in textile finishing and manufacturing, and man-hours worked in each month of 1939.

Under the Census of Business, figures are being collected on the various steps in distribution of textile and other American products—sales or transfers of products to manufacturers' own branches, sales to industrial users, wholesalers and exporters, etc., down through retail sales to household consumers.

The Census of Agriculture, beginning in April, will make careful count of quantities and values of wool, cotton, mohair, flax, etc., grown or produced in 1939. Of course, all other angles of farming will be enumerated. The average farmer, in fact, will answer about 130 questions on crops, acreage, livestock, income, and so on. The separate Census of Drainage and Irrigation will cover the engineering and agricultural phases of farming irrigated lands in the arid and semi-arid States.

Census On Employment

Figures covering employment on a nation-wide basis, as well as for States, counties, cities and selected towns, will be collected when the Census of Population enumerators begin their work in April. Besides the usual population queries on age, sex, family, etc., facts will be assembled on all persons over 14 concerning the number of weeks worked in 1939, the amount of money wages or salary received, occupation and industry, worked at, etc. On a 5 per cent "sample" basis, in addition, will be gathered (among other things) material on *usual* occupations as opposed to *current* jobs—information of value in tracing trends of employment, changes in industry, and so on.

Textile employees in mill towns, and residents of all other towns and communities in the United States, will be visited by enumerators taking the Census of Housing. The results of this census, which will cover every dwelling place in the country, will afford comparable statistics on standards of living in various sections and under differing conditions. The information to be collected will consider age, type, value and exterior material of each home; ownership or rental status; totals of monthly bills; sources of water and types of toilet facilities; equipment used for heating, lighting, cooking refrigeration and the like.

Answers Required

Answers to census questions are required by Act of Congress. The census, as a matter of fact, is not only an American institution but a constitutional requirement, the first enumeration having been made in 1790—150 years ago—in obedience to the Constitution's direction that a periodic count should be made of all persons in the country for the determination of Congressional representation and proportional taxation.

While census figures are still the basis for Congressional apportionment, the taxation requirement no longer holds. In fact, Congress forbids the use of Census declarations for any such purpose as taxation, regulation, or investigation. Census information can be released only in broad statistical form, and even then only when the figures given cannot be traced to a specific person or firm.

Figures Ready in Fall

Preliminary figures from the Business and Manufactures enumerations this year will be ready for publication in textile and other journals by early fall. Detailed reports will follow as rapidly as they can be prepared, while basic statistics on Population, Agriculture, Housing, etc.. will be released within a few months.

Manufacture of textiles and textile products was one of the leading activities in Colonial America, according to the now-tattered volumes reporting the First Census of Manufactures, taken in 1810. Common entries report production of "Cotton Goods in Families" and "Woolen Goods in Families"—indicating the domestic nature of much of the early manufacturing here.

S. C. Industry in 1810

Because of the grouping of industries and the some

(*Continued on Page 44*)

Machinery Used In The Application of Fast Dyes To Cellulosic Fibers

By Ormand W. Clark

The first part of this paper, covering the introductory portion, raw stock dyeing, skein yarn dyeing, package yarn dyeing, warp yarn dyeing, piece goods dyeing, and jigs, was published January 15th. The remainder follows:

Padders

The padder is a high speed dyeing device consisting of a means for saturating fabric with a dyestuff solution and then squeezing out the excess liquor, delivering a well penetrated levelly dyed product. Because the time element is short, pad dyeing as a self-contained process is used only for dyeing light shades where maximum fastness must be sacrificed to rapid low cost production. The cloth passes through the machine at speeds which in the majority of cases ranges from a lower limit of about 40 yards a minute to an upper limit of about 180 yards a minute and is then ready for drying.

c Early types of padders consisted of two cast iron rollers lapped with many layers of cloth and running in maple or lignum vitae bearings lubricated with suet. The dye was contained in 50-gallon wooden tanks wedged under the squeeze rolls and fed by hand ladling from a barrel. Cloth lapping and wooden vats had to be changed with each change in shade. While the last padder with iron squeeze rollers and large removable wooden tanks was seen by the author in 1924, and rubber covered rollers were in general use at that time, the evolution of most elements of a padder has been very slow, and suet lubricated wooden bearings were still in use as recently as 1936.

So many types of padders have been conceived, and the construction of specific fabrics together with the nature of the dyeing process bear so much influence on the design of the machine, that it is difficult to designate a particular type as ideal. Illustrative of the chief fundamentals of thoroughly modern padder design, and a type which probably is of as universal application as any one padder could be, is the following type:

The lower equeeze roller ,the driven roller, is covered with hard rubber, and is 24″ in diameter. The upper squeeze roller, turned by friction against the lower roller, is covered with rubber of less density, is 16″ in diameter, and is slightly crowned to compensate for deflection under load and to provide equal pressure across the entire face. The rubber is compounded to resist the chemicals and temperatures used in dyeing and to resist abrasion and should be not less than 1″ thick to allow for reduction in thickness by the periodic buffing needed to maintain its true surface. When the rubber thickness reaches about 5⁄8″, the resilient cushion becomes inadequate for satisfactory work. The metal core of the rollers is of sufficiently heavy construction to minimize deflection under load. The journals revolve in heavy roller bearings with adequate lubrication and supported by a massive framework.

The pressure exerted at the nip is regulated by a compound lever system, terminating in weighted levers, which can be adjusted so that the fabric leaves the nip containing, as desired, from 60 to 100% liquod content. An auxiliary lever system is provided to separate the rollers during lulls in production.

The dye is contained in a stainless steel trough closely fitting the contour of the bottom roller, and provided with a flaring lip front and back. A perforated spray feed pipe delivers the dye liquor to the rear lip where the rotation of the bottom squeeze roller mixes it with the dye already in the pan and carries it around to the front of the machine. A guide roller in the front lip of the trough submerges the cloth in the dyebath and delivers it to the nip. A removable splash plate over the guide roller dips below the surface of the dyebath to prevent scum from flowing on to the dry cloth and extends above and in front of the nip to prevent splashes out of the nip from impinging on the dry cloth. A weir at each end of the front edge of the immersion lip drains surface scum and lint from the dyebath into an overflow trough and also maintains a constant level in the trough. Splash plates at each of the nips collect excess liquor, which flows endwise out of the nip when the padder is operated at high speeds and conducts it back into the trough. The capacity of such a trough for 45″ face squeeze rolls is 3 gallons. The trough is supported independently of the spray feed pipe and cloth guide roller, and is easily demountable for cleaning.

The spray pipe in two sections screws hand tight into a tee to the thjrd opening of which is screwed the feed line from the supply tank. All pipes are inside polished stainless steel to facilitate cleaning, and bends are used in place of fittings wherever possible, in order to reduce to a minimum, crevices where dye or extraneous matter might catch temporarily and later come free to cause imperfect dyeing. The feed tank of stainless steel has a long handled plug to seal the pipe line while solid matter is being dissolved, since without this provision it might entrap

some undissolved material. A portable agitator is clamped to the tank.

The overflow from the front of the padder is strained and pumped back to the supply tank. Feed from the supply tank to the padder trough is by gravity. Temperature is thermostatically controlled.

Rubber covered mycock expanders are situated before and after the nip for use with fabrics which tend to crease. Efficient expanders requiring less friction to operate would be a very valuable improvement. If the cloth is supplied in rolls it is fed into the machine from a friction brake controlled let-off at the front of the padder. It is batched at the rear of the machine under tension supplied by a slip belt or friction disks. These manually controlled friction devices are rather unsatisfactory, especially for wet rayon fabrics. It would seem that an adaptation of the mechanism of the tensionless jig to the feed and delivery of the padder would permit the processing of fabrics which it is now either impossible or egregiously difficult to handle. The padder is also equipped with a plaiting reel in the rear and tension rails at the front so that cloth may be run from truck to truck, instead of from roll to roll.

The main drive is by electric motor with a variable of 1:3 speed ratio directly connected to the padder through herringbone reduction gears. An inching control is provided to facilitate threading the cloth through the machine.

The production of compound shades, more uniform throughout a large yardage than is now attainable, may in the future be obtained by feeding each component from a separate supply tank with a solenoid valve controlled by color discriminating photo-electric systems actuated by the dye liquor in the padder trough or by the dyed cloth as it leaves the nip. There is some evidence that experimental work on this problem has been conducted by large mass production dyers catering to an exacting clientele.

Various reasons have impelled modifications of padder design:

1. To increase the dyeing time and color absorption.

2. To increase penetration as well as dyeing time and color absorption.

3. To combine the above purposes with the elimination of the danger of picking up scum from the dyebath.

4. To minimize the effect of dyestuff exhaust on the uniformity of shade and to leave a minimum quantity of unused dye at the end of a run.

Continuous Dyeing Machines

By combining a padder with a series of roller vats, squeeze rolls, skying rolls, and drying devices, a continuous dyeing range may be created to give a high production rate with good fastness and good uniformity of shade over a very large yardage. A modern layout is typified by the following arrangement:

A padder with an efficient roller hot flue suspended overhead is followed by a ten-compartment open width roller vat machine with two sky frames overhead. The ten-compartment machine is fitted with roller bearing guide rolls, synchronized rubber covered squeeze rollers between each compartment, vacuum slots, expanders and water sprays in front of each nip, auxiliary supply tanks, and thermostatic heat controls. Following the compartment machine is a drier, either cans or roller hot flue. The same elements of modern design, including automatic shade control, as have been described in connection with jigs and padders should be applied to such a range.

Such a machine can perform a variety of dyeing operations at a speed of 100 yards a minute, taking white cloth from trucks at the entrance to the machine and delivering the completely dyed and dried cloth into trucks at the exit of the range. No stop is necessary as the bottom end of one truck of cloth is sewed to the top end of another truck while the machine is running. A few illustrative processes will demonstrate the adaptability of such a range.

1. Broadcloth shirting fabric is dyed a light blue shade with vat dyes. The cloth is padded with the leuco vat dye and then enters an alkaline reducing bath in Compartments 1 and 2 to extend the dyeing time and thereby secure proper dyestuff fixation and satisfactory fastness. The cloth is rinsed with cold water aided by sprays and squeezing at the nips in Compartments 3 and 4. It is oxidized in Compartment 5; soaped in Compartments 6, 7 and 8; rinsed in Compartments 9 and 10 and can dried.

2. A plain weave light weight cotton cloth is dyed a bright red shade with insoluble azo dyes. The cloth is padded through the first component, a naphthol solution, and is dried in the overhead roller hot flue. It then runs over a skying frame to lower the temperature and then enters Compartment No. 1 containing the second component, a diazo solution. Leaving the first compartment, it passes over the second overhead skying frame to allow more time for dyestuff formation; and then is rinsed in Compartments 3 and 4; soaped in Compartments 5, 6, 7 and 8; rinsed in Compartments 9 and 10, and can dried.

3. A khaki shade is dyed with sulphur dyes on a 2.85 cotton drill. The cloth is padded through the sulphur dye solution and then passes over a skying frame to partially oxidize the dye. It then is rinsed cold in Compartments 1, 2, 3 and 4; rinsed hot in Compartment 5; after-treated with sodium bichromate and acetic acid in Compartments 6 and 7, and rinsed hot in Compartments 8, 9 and 10, and can dried.

The radical improvement of dyeing machinery is of quite recent origin. It has not yet reached an equal stage of advancement in all fields of dyestuff application. The trend to mass production methods not only is bringing lower unit cost, but it is also bringing improved quality, especially with regard to the uniformity of shade of large lots. The future trend will be towards faster rates of production. Equipment must be devised to compensate for the short time element available in continuous dyeing methods and to achieve better fastness, approaching more closely that secured by the more orthodox dyeing processes. The control of operations must become still more precise for the time is not far off when dyed textiles must conform more exactly to scientifically specified standards which can be accurately measured by objective physical instruments whih are now in process of development and refinement.

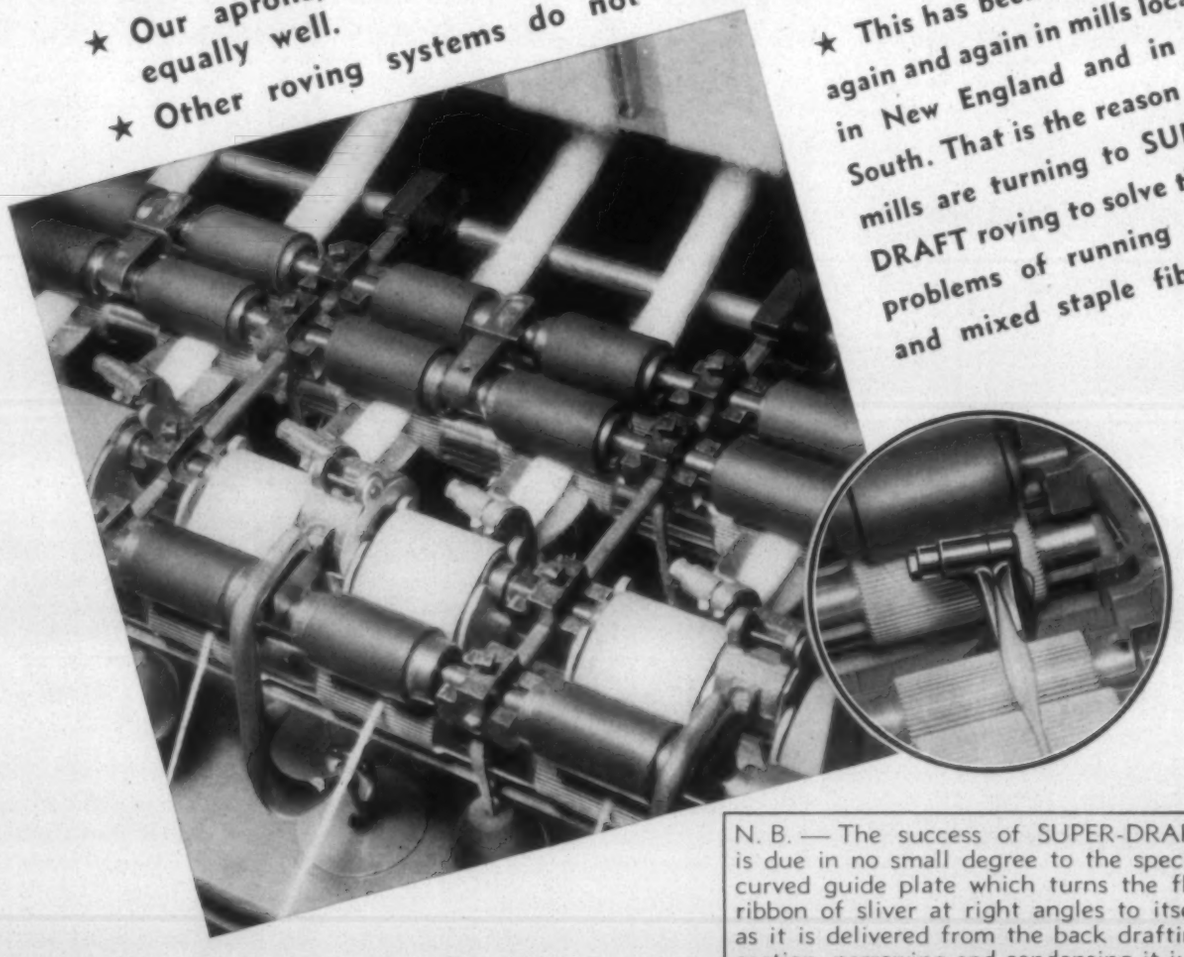
WHY IS SUPER-DRAFT THE ONLY SINGLE PROCESS ROVING SYSTEM ON WHICH MIXED FIBERS OF DIFFERENT LENGTHS CAN BE SUCCESSFULLY RUN ON COTTON MACHINERY?

★ It is the only system of roving that can control VARYING LENGTHS and VARIOUS TYPES of staples.

★ Our aprons, with their pressure on the fibers, CONTROL BOTH equally well.

★ Other roving systems do not control MIXED staples.

★ This has been demonstrated again and again in mills located in New England and in the South. That is the reason why mills are turning to SUPER-DRAFT roving to solve their problems of running cut and mixed staple fibers.



N. B. — The success of SUPER-DRAFT is due in no small degree to the special curved guide plate which turns the flat ribbon of sliver at right angles to itself as it is delivered from the back drafting section, narrowing and condensing it just prior to entry into the bite of the back line of rolls on the front section.

N. B #2 — No other device brought out for the purpose has ever proven so effective.

WHITIN MACHINE WORKS

WHITINSVILLE, MASSACHUSETTS, U. S. A.

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CLOTH WIDTH

An Engineering Problem of the Cutting Trade

By Alfred C. Abrahams

THE needle trades which manufacture men's apparel constitute the last step in the chain of textile activities. As consumers of mill products and because of the value of their output and the large numbers employed in them, they logically should have settled upon specifications for the fabrics which they use. The reverse is true. Producers of men's apparel have accepted without question the goods which are offered, letting the mills create the styles and determine the width of cloths. The existence of these conditions is due largely to the development of the cutting-up trades. To enter them was easy because little capital was required, precision not fundamental, and production farmed out. Further, machinery for the making of wearing apparel came into existence later than that for other trades, and was slower in special development.

The invention of the sewing machine by Elias Howe in 1846, and the need of apparel for the soldiers during the Civil War, shifted production from the home to the factory. A new industry was born. The public was slow to change from the products of their individual tailors and to try the so-called "hand-me-downs" sold at retail. The development, therefore, was slow. The production units remained small. Labor and material was cheap. Wasteful methods had little effect on costs and selling prices.

No Textbooks Nor Schools

With progress in the industrial world and the public's acceptance of ready-made garments, mass production began to take hold of the needle trades at the turn of the century. Developments were slower than in other manufacturing enterprises, both in machinery and methods. Despite the size of the industry, no courses were offered for the needle trades in any technical schools. Even now there is no fundamental common source of knowledge, gleaned from recognized text books and institutions, and creating pride in and respect for the industry. As a result there are few trained scientists, engineers, and research men in this field, who approach problems with that open minded technique so essential to progress and who are consistently articulate in their demands for progress.

The American idea of improving the happiness of all through the possession of a larger variety of things and of creating the time and leisure to enjoy these things, has exerted pressure upon all industries ever to be on the alert to produce more and better goods at lower prices. The apparel trades have not been excepted. They are subject to the same demands, and find themselves faced with the same problem of improving their products and lowering their costs.

Width of Cloth Important

Foremost among the elements affecting operating costs is the width of fabrics used. All manufacturers of men's apparel know its importance and relation to labor cost and waste. Because of the small size of the manufacturing units and their lack of organization, little has been done to bring the mills to realize the importance of width and its uniformity as a means of reducing costs and increasing volume.

The first reaction to the question of width will be that the measurement of cloth by the square inch system prevails, and that the amount per garment remains constant. The wider the cloth, the less the yardage used. The narrower the cloth, the more the yardage consumed. With cloth priced on the amount of material in the yard, the cost of the garment remains the same. This reasoning is only partly true, and does not take into consideration the human element, the time element, the extra operations resulting from piecing when cloths are too narrow and the style element which has decreed larger and roomier garments than those worn a decade ago.

The manufacture of men's apparel starts with the making of patterns. These are governed in size by the breast measurement and vary according to models. They may run from children's size four, 23 breast, to a large stout for a man of 52 breast. Naturally all parts of the suit are in proportion to the breast size.

Laying of Pattern

The cutting-up begins with an operation known to the trade as "making a lay;" that is, the proper laying in of the patterns of a given number of sizes in a specified number of yards, so that the amount of waste remaining after the section is cut, will be the minimum. This operation calls for a high degree of skill and considerable experience.

The procedure of the cutter depends on the width of the cloth. When it is wide, he starts with the larger parts first, because he can lay them out quickly. Then he takes the small pieces which he can adjust with reasonable ease and speed, and completes the lay in the yardage allotted.

With a narrow piece of cloth the problem of the cutter is more difficult. He automatically proceeds more cautiously, mixing large and small parts at the start. Thus, large and small parts are left for the end, making difficult the adjustment of the pattern to the yardage allowed, and often compelling the cutter to call for more expert assistance. It is safe to say that such assistance is more often needed on narrow than on wide fabrics. Normally a 36-37-38-39-40 section will take 15.10 yards on 54″ goods, 15 yards on 57″ cloth, and 14.6 yards on 60″ cloth.

The problem of the cutter is less acute in suits than in shirts and pants. In suits, which have coat, vest and pants, there are 8 large pieces and 16 small ones. The larger the number of pieces and the greater the percentage

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Choosing the Proper Ring Traveler

By John T. Kersey

AFTER devoting a great deal of time conscientiously in search of the maximum efficiency and usefulness of the various styles, widths and makes of ring travelers on the market for the past 25 years, I have come to the conclusion that i tis not a very easy job to prove one make of traveler inferior to other makes if all that are tested be given the same chance in every way, and no partiality be shown any special make. When the object in making comparative tests of the different makes is to find the most economical traveler to use, taking everything into consideration, it is very necessary that the test be made honestly and thoroughly, i.e., tested the same way on the same frame and on the same rings. The travelers should be the same width, shape and weight also.

First, we should be sure that the width weights and style best suited to the rings and yarn count be used in the test, which is common knowledge among spinners of long experience, but can only be learned by beginners through careful experimentation with existing conditions over a long period of time.

Knowing the correct weight and style to use, our first test should be for the useful life or toughness of each make of traveler we are interested in, or to find out how long each make will stay on the ring and give satisfactory service. The test should be made on a frame having the highest spindle speed and the largest rings, as it stands to reason that any traveler that will give good service on the largest rings and highest spindle speed will not fall down on a smaller job. The rings on which the test is to be made should be numbered, and the record which is kept should show at a glance the total number of travelers that wear out and fall off each ring (not broken off). If the rings have been in use a good long time some of them will wear out more travelers than others, but this will not affect the test, as each make of traveler will have the same showing regardless of the condition of the rings, provided the period of time for each make is the same.

In mills where the travelers are not allowed to run until they wear out and come off, it is possible that they are sometimes changed before they actually need to be changed.

This test will prove very valuable also in determining the maximum length of time to let the traveler run before changing them. After making it, if the record has been kept accurately, the information should be sufficient to form a very satisfactory opinion as to which make of traveler suits present conditions best. A record similar to the one below is very good, although it could be carried farther.

Record of Comparative Performance

1. Kind of yarn . . . . . _____
2. Speed of spindles, R.P.M. . . . . _____
4. Flange No. . . . . _____
5. Yarn No. . . . . _____
6. Traveler No. . . . . _____
7. Hours runs . . . . . _____
8. Total spindles used . . . . . _____
9. Total travelers used . . . . . _____
10. Travelers used per spindle per day and hour_____
11. General average condition of rings . _____

Other Tests

One other test which is also of value to the mill is what I consider or call the good spinning test. In this test a record is kept of every end that breaks and the cause of the breakage. The record should show the breakage and cause of each end separately the same as the other one in order to reveal any irregularity of any individual spindle or mechanism used. This test will also show the quality

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William Skinner & Sons

Modernize

Modernizing

—Transcript-Telegram Photo.

The first in a group of 64 model XD Draper looms for the William Skinner and Sons silk mills is shown being hoisted to the fourth floor of the Appleton street division. The looms are the last word in the production of silk and rayon piece goods. They will replace outmoded equipment.

From Holyoke Transcript of November 24, 1939.

DRAPER CORPORATION

Important Chemical Developments in the Textile Industry*

By Dr. E. R. K. Schwartz

TEXTILE progress more than ever is chemical progress, and our textile industry is profiting ever more by research carried on by the chemical industry. As a matter of fact, the chemical industry is responsible for the most radical change that has ever been heralded in the textile industry. I do not want to bore you with reciting a long list of inventions and patents or processes, new dyestuffs, finishes, or machines. What I propose to do is to paint for you a picture of the fundamental progress that has taken place in recent years—a picture that you can have before you as a whole rather than in part. To talk about textile progress today is—with some exceptions of course—equivalent to considering in a broad sense progress in new textile materials and their application. You, as textile technologists, are mainly interested in materials which are suitable for textile fibers and how these textile fibers can be made adaptable to making fabrics of all sorts, especially how to evolve novel effects, new textures, and improved qualities. Allow me a few seconds for creating the background for our picture.

There are three distinct phases or eras into which the history of the textile industry may be divided. They are:

First—The era of selecting, using and adapting the available natural fibers.

Second—The era of utilizing the basic materials of which the natural fibers are composed in order to produce artificial or man-made fibers. These basic baterials are cellulose in case of vegetable fibers and protein substances in case of animal fibers. Perhaps this era could be called the era of converted fibers.

Third—The era of producing synthetically new types of raw materials from which textile fibers can be made. These new materials, incidentally, are suitable for making other products such as sheets, bristles, artificial hairs, etc., the same as can be made from cellulose and protein materials.

For a material or a fiber to be suitable as a textile fiber certain properties are necessary. These properties may be divided roughly into two categories, namely:

A—Fundamental or primary properties.

B—Contributory or secondary properties.

It is within this framework of primary and secondary properties, that we can paint the picture of textile progress of recent years. Let us briefly review these properties:

A—*Primary Properties*

1. Form
2. Strength
3. Suppleness or flexibility
4. Stability to physical and chemical action

B—*Secondary Properties*

1. Resilience
2. Elasticity
3. Hygroscopicity (moisture absorption)
4. Crimp
5. Shape (cross sectional)
6. Luster
7. Affinity (for dyes, finishes, etc.)
8. Their ability to react with or resistance to chemicals.

It is these two last properties around which all the processes of dyeing, printing, finishing, mercerizing, etc., revolve. I shall not follow this order of properties rigidly in describing the latest developments but for the sake of expedience I will have to jumble them a bit and do it in a "wrong way Corrigan" manner. To this end, I will consider the secondary properties first and the primary ones last. This is the way the textile processing industry approached its problems, because little if anything was known about the properties of the materials of which the fibers are composed.

Affinity For Dyestuffs

Let us first consider the affinity of fibers for dyes or chemicals. Up to relatively recent years we were entirely

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*Paper presented at meeting of American Association of Textile Technologists, December 6, 1939.

S. C. Mill Men Cite New England Effort To Regain Textile Mills

Further evidence of the keen rivalry existing between States endeavoring to secure new industries was brought out recently in a letter received by one of South Carolina's cotton manufacturers, according to the Cotton Manufacturers' Association of South Carolina.

The letter, written by a business man in Massachusetts, comments on a report that the South Carolina textile executive planned to expand his plants, and states in part:

"I understand that you are going to build a mill. Why do you spend all this money for a new mill in the South, when I can sell you an up-to-date mill here in New England, of 100,000 square feet of floor space, water power, railroad siding, no labor trouble, and your taxes would be about $3,500 per year. Located in an all-American town of about 7,500 people, good, first-class cotton mill workers. Price, $45,000.

"I have another mill almost in the same yard which has 60,000 square feet of floor space, for $35,000."

The letter explains that both of the mills, with a total floor space of 160,000 square feet, are available for $80,000. Manufacturing costs, the letter adds, are much less in New England than in the South.

The Massachusetts correspondent concludes: "By putting one of your mills here in New England you can save a lot of money, and only 275 miles from your New York market."

South Carolina textile officials, commenting on the letter, stated that it was an additional example of efforts being made by New England States to recapture the textile industry, lost by what they termed "excessive taxation and unfair legislation." The combined prices offered by the New Englander amount to less than one-third of the cost which would be involved in the erection of a new mill in South Carolina of the same size.

Osnaburgs for Sand Bags

According to an announcement by the Cotton-Textile Institute, a new specification, No. 6-280, promulgated by the War Department in Washington, now makes permissible the use of cotton osnaburg in the manufacture of sand bags. Normally, sand bags purchased for U. S. Army use are made of burlap fabric. European hostilities having caused a contraction in the free supply of burlap with accompanying violent price increases, the new specification opens the door to the potential use of millions of yards of cotton goods.

Taking into account the present comparative prices of cotton osnaburg and jute burlap, Charles K. Everett, of the Institute, point sout that by reason of the longer life of the cotton fabric, the army can now avail itself of an advantageous purchasing opportunity. Studies by U. S. Army engineers show that osnaburg will withstand exposure to the elements half again as long as other fabrics tested for sand bags. The extra durability of the osnaburg, therefore represents an important economy factor in that cotton sand bags not in the zone of direct fire will have to be less frequently replaced on account of disintegration of the fibres.

The new specification in question makes acceptable for manufacture into sand bags the standard 32x28 osnaburg construction in any width from 30 up to 40 inches. A breaking strength of 80 pounds each in the warp and in the filling of this fabric and a weight of 8 ounces per square yard are required.

1939 Rayon Yarn Production and Consumption Establish New High Record

Production and consumption of rayon yarn in the United States established a new all-time high record in 1939, states the *Rayon Organon*, published by the Textile Economics Bureau, Inc.

Total rayon production last year amounted to 384,000,000 pounds, or 12 per cent greater than the 341,900,000 pounds produced in the previous record year of 1937. Filament yarn production accounted for 331,200,000 pounds of the 1939 total, which was a gain of 29 per cent compared with 1938 and 3 per cent above the previous record year of 1937. The 1939 production of staple fiber, totaling 53,000,000 pounds, was 77 per cent greater than the previous record year in 1938 and 162 per cent greater than the 1937 output.

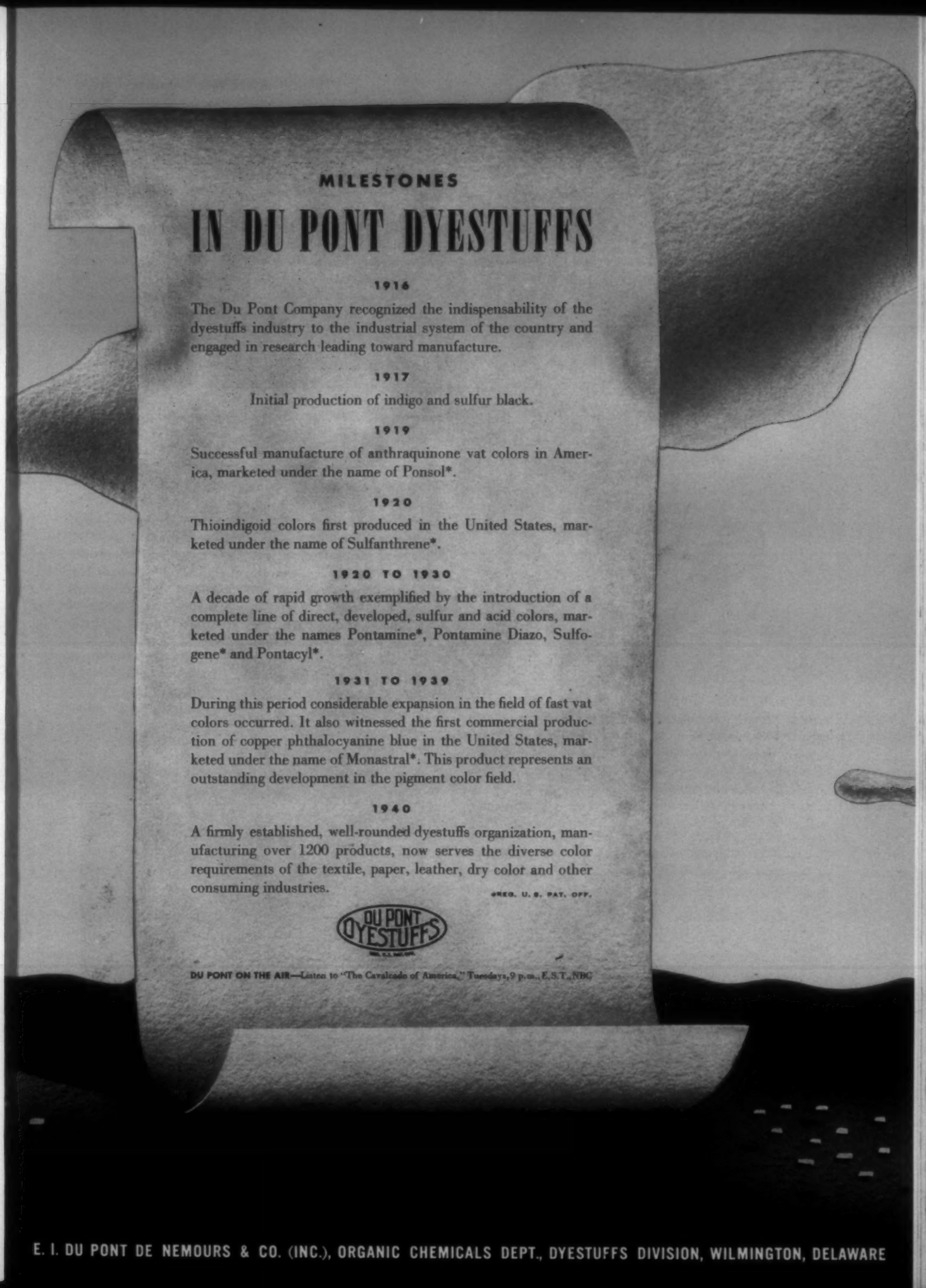
Domestic consumption of rayon amounted to 462,375,000 pounds in 1939, also a new all-time record, which compares with a total of 327,120,000 pounds consumed in 1938, an increase of 41 per cent. Filament yarn consumed in 1939 totaled 362,375,000 pounds, which was 32 per cent greater than the 1938 consumption, whereas staple fiber consumption jumped to a total of 100,000,000 pounds last year, an increase of 88 per cent compared with 1938. The latter total includes 47,000,000 pounds of imported fiber.

Commenting upon world conditions in the rayon industry, the *Organon* states: "It is estimated that in 1939 the United States produced approximately 29 per cent of the world's rayon filament yarn and about 5 per cent of the world's staple fiber output. In accounting for this large share of the world's filament yarn output, the United States retained its place as the world's leading rayon yarn producing country, its production exceeding that of Japan, its nearesht competitor, by nearly 45 per cent. Although showing a large increase over 1938, the 1939 United States rayon staple fiber production amounted to only 5 per cent of the world total."

Cotton Acreage Allotment for 1940 Set At 27,070,173

Washington, D. C.—State cotton acreage allotments for 1940, totaling 27,070,173 acres, were announced January 3rd by the Agricultural Adjustment Administration. The national allotment for 1940 is 472,842 acres less than for 1939, but the total acreage alloted to farmers under the minimum allotment provisions of the Agricultural Adjustment Act will be larger than last year, which will offset a substantial part of the reduction.

The 27,070,173 acres alloted directly to 19 cotton-producing States, plus the increase under the minimum allotment provisions, will result, with normal yields, in a crop of about 12 million bales, approximately that fixed by Secretary of Agriculture Wallace in proclaiming cotton marketing quotas for 1940-1941.


MILESTONES
IN DU PONT DYESTUFFS
1916
The Du Pont Company recognized the indispensability of the dyestuffs industry to the industrial system of the country and engaged in research leading toward manufacture.
1917
Initial production of indigo and sulfur black.
1919
Successful manufacture of anthraquinone vat colors in America, marketed under the name of Ponsol*.
1920
Thioindigoid colors first produced in the United States, marketed under the name of Sulfanthrene*.
1920 TO 1930
A decade of rapid growth exemplified by the introduction of a complete line of direct, developed, sulfur and acid colors, marketed under the names Pontamine*, Pontamine Diazo, Sulfogene* and Pontacyl*.
1931 TO 1939
During this period considerable expansion in the field of fast vat colors occurred. It also witnessed the first commercial production of copper phthalocyanine blue in the United States, marketed under the name of Monastral*. This product represents an outstanding development in the pigment color field.
1940
A firmly established, well-rounded dyestuffs organization, manufacturing over 1200 products, now serves the diverse color requirements of the textile, paper, leather, dry color and other consuming industries.
*REG. U. S. PAT. OFF.
DU PONT DYESTUFFS
DU PONT ON THE AIR—Listen to "The Cavalcade of America," Tuesdays, 9 p.m., E.S.T., NBC
E. I. DU PONT DE NEMOURS & CO. (INC.), ORGANIC CHEMICALS DEPT., DYESTUFFS DIVISION, WILMINGTON, DELAWARE

Important Chemical Developments in the Textile Industry

(*Continued from Page 12*)

dependent upon the natural affinity of fibers (natural as well as artificial) if we wanted to dye or print them. We had to make dyes to suit the fibers. As we learned more about the nature of the fibers, however, we were able to change this affinity of the various fibers at will and so we made cotton take acid colors, which, up to then, could only be used on wool or silk, or we could treat cotton in a way so as to become immune to direct dyes, hence the name, "immunized cotton." We could not, however, make use of a class of dyestuffs which possesses very remarkable fastness and other properties, namely, certain pigments. I am not referring here to organic pigments such as alizarine or vat dyestuffs, but to true insoluble pig-

ments such as are used for paper printing. There has been a most remarkable development in this class of dyes in recent years, which in turn had a decisive influence upon a newly developed process for printing of textiles. I have in mind a new class of pigments, called phtalocyanines and sold under the name of Monastral colors. The new printing process, which now is becoming a new dyeing as well as a finishing process, is the Aridye process, which you all know. The phtalocyanines were discovered by accident, as so many things have been. They were first observed as an impurity (and a very embarrassing one) during the purifying process of commercial phtalimide. This impurity was of a dark blue color and proved to contain iron from the iron vessel in which the process was carried out. Other similar compounds were prepared from copper, nickel and other metals and this led ultimately to the discovery of a new class of insoluble pigments—the Phtalocyanines. They are all green to blue, there are no reds or yellows. They have an extreme intensity and beauty of color and are exceedingly fast to light, water, chemicals and even to heat. As a matter of fact, they are faster than anything in color, produced so far. They sublime chemically unchanged at 550° C. Due to their insolubility they were used first for coloring paper and plastics. Later on, they were used for dyeing rayons (viscose and acetates) in the mass and we have now halogenated and sulfonated phtalocyanines for dyeing textiles. These products possess the same fastness properties as the original insoluble pigments. These insoluble pigments, however, have lately found a wide field of application in a coloring process developed by a subsidiary of the International Printing Co., Inc., which makes use of new knowledge gained in the field of resins and solvents. This is the so-called Aridye process. The idea of coloring textiles with the aid of suitable solvents and resins is not at all new. As a matter of fact, big chemical companies such as the I. G. have been working on this idea for many years. But it remained for American research to solve this problem in a practical way, because it was here that new solvents, as well as new resins, were available which together with the great experience in paper printing and colloidal phenomena made this development possible. Textile printing as compared to modern high-speed paper printing is very slow indeed—only about one-tenth as fast. Also, paper printing is higher developed as far as fidelity of reproduction, shading and color effects are concerned. The fundamental factors as relating to rotogravure paper printing and textile printing are essentially the same. Cylinders for paper printing are shallow, those for printing of fabrics are mostly deeply engraved. This fact is due to the coloring medium, which is the fundamental difference between these two kinds of printing processes. This medium is the "printing paste" for textile printing—for paper printing this medium is the "printing ink." The printing paste is generally made with water soluble gums or starches which form a so-called pseudo-plastic medium. This requires a deep engraving. The printing ink, on the other hand, is an organic solvent solution of resins or resinous materials in which pigments have been dispersed. Their physical characteristics make possible printing of fine engraving at high speed. The most difficult problem at the outset was not to produce a continuous film or resin upon the fabric. The tendency of the resin solution to form a film and cause stiffness of the fabric had to be solved. The rapid advance of knowledge in the field of synthetic resins made it possible to obtain such resins which combine with cellulose to such a degree to make the resin virtually a part of the fiber. This has nothing to do

with chemical affinity, it is purely physical. This problem of printing with pigments could not have been solved without new aspects in the science of dispersion. The physics of dispersing insoluble pigments into resins so that each minute particle of color pigment is colloidally surrounded by resin is tremendously involved. This is a science by itself and it helped materially in solving the problem of avoiding the formation of continuous films, of improving penetration, of adhesion, of crocking, etc. Today this process is used by a great number of big textile

printers and is a big business. It is interesting to note that this process is now being carried over into the dyeing of textiles. That is to say, that fabrics are now printed with a solid roll (not engraved) so that the whole fabric is actually printed in one solid shade. At the same time, a semi-permanent or even permanent finish can be applied. The possibilities of this new type of printing or dyeing of fabrics are indeed vast and might well lead to another revolution in dyeing and finishing of fabrics. Many problems, which the dyer had to face, such as unevenness, streakiness, hard water, etc., are at once eliminated.

Synthetic Resins

Since we are discussing synthetic resins it is in order to recall to you the interesting paper by Dr. Powers delivered last summer. In this paper, Dr. Powers told us about the use of various synthetic resins, especially of the urea-formaldehyde type to produce such interesting effects as non-crushability of cotton and rayon fabrics, effects which in most cases are permanent. Here we have another example of how we can modify and improve some of the properties of our textile fibers, in this case, resilience—or rather—the lack of it. The remarkable thing about these resins is that they can be brought within the fiber while still soluble and then by a curing process are converted into an insoluble resin. Although this resiin is itself very brittle, it does not change the flexibility of the fiber. Even in small quantities it gives quite a full hand to many rayon or cotton fabrics. When deposited on the outside of the fiber, it makes fabrics slip-proof. It is not necessary here to elaborate on this subject of resin finishes except to say that now resins of this type are available in organic solvent emulsions which can be applied to fabrics as water emulsions and need no curing at high temperature.

But there is another use or possible use of the urea-formaldehyde condensation on dyes, which seems to have been overlooked or forgotten. Often, direct dyeings on cotton or rayon after treated with these resins are faster to light, washing and rubbing than the regular dyeing itself. This should be taken advantage of more than it is at present, especially with the new class of dyestuffs, which are not affected by formaldehyde. There is a patent hiding in the vast patent literature which utilizes this fact. It comprises printing of silk with lamp-black and dimethyl-urea. This print is absolutely fast to light, washing, water and crocking. These processes deserve undoubtedly more attention than they receive at present.

(*To be continued*)

Textile Chemists To Meet

Greenville, S. C.—Approximately 200 delegates from the Carolinas are expected to attend a meeting of the Piedmont Section of the American Association of Textile Chemists and Colorists here February 10th. According to an announcement by H. E. Keifer, Jr., of Ware Shoals, chairman of the Piedmont Division, an afternoon technical session beginning at 2:30 o'clock will be followed by a banquet at 7:30 P. M. featuring an address by Dr. J. S. Long, director of research for the Devoe & Reynolds Corp. Mr. Keifer said that technical papers by a number of textile experts will be read at the afternoon session.

Vinyon—A New Textile Fiber*

By Dr. F. Bonnet, American Viscose Company

THE idea of obtaining textile fibers from gums and resins is, of course, not new. Dr. Robert Hooke mentions the matter in his Micrographic published in 1664 and later the French naturalist, Rene Reamur, refers to resin fibers in his book on insects published 1734 in these words:

"Silk is only a liquid gum which has been dried; could we not make silk ourselves with gums and resins?" In spite of these early suggestions the first silken fibers produced commercially were, of course, not made from gums or resins but from cellulose for the ordinary natural gums or resins are quite unsuited to be drawn or spun into useful textile fibers. It was not until the discovery of synthetic resins that this became possible.

With the discovery of the phenol-formaldehyde condensate resin Bakelite, followed by a host of other synthetic resins which go to make up the plastics industry today, many new properties of these resins became known; and while many uses have been found for these new plastic materials, only a very few have been found suitable for spinning into useful textile fibers.

Apparently only those thermoplastic polymers are suitable which are straight chain or linear polymers and the longer the straight chain is (i. e., the greater the molecular weight of the polymer) the stronger and more resilient will be the resulting fiber. All of which is best exemplified by the new polyamide resin nylon and the polyvinyl resin "Vinyon," and like nylon it too can be said to be made of coke, water and air or better still from coke-limewater and salt; but between these very basic raw materials there are, of course, many intricate steps before the textile yarn emerges.

Copolymer of Vinyl Chloride and Vinyl Acetate

Vinyon is a copolymer of vinyl chloride and vinyl acetate produced by polymerization rather than by condensation, as is the case with the phenolic, urea and alkyd and similar types of resins. Polymerization of the monomer may be brought about by irradiation with ultra-violet light; the addition of a small amount of peroxide or of ozone, and various catalysts. The polymers so obtained are straight chain or linear in which the monomers have reacted with each other at the double bond to form the high molecular weight polymers.

Vinyl Chloride

The vinyl chloride by itself gives a remarkably strong and tough film, but its softening, molding or flux temperature is so high that it is quite difficult to mill and mold free from strain. Hence plasticisers must be used if the right tensile and impact strengths and other good physical properties are to be retained. By the proper choice of plasticisers and thoroughly blending on a hot roll mill, a rubber-like material is obtained which can be molded or pressed into any desired shape. By varying the amount of plasticiser or by adding fillers, pigments, dyes, etc., during milling, the properties of the resins can, of course, be modified. Because of the resistance of the resin to acid, alkali, salt solutions, fats, oils, etc., it has found use as sheets, rods, tubes, etc. Hence it seems to be replacing rubber for transmission belts not only because it has greater chemical inertness but because of its greater strength, its greater flexing life and its greater resistance to sunlight and all oxidizing and weathering effects.

Vinyl Acetate

The second polymer, namely, vinyl acetate, has properties quite different from the chloride. It begins to soften, for example, only a few degrees above room temperature and its mechanical strength is not anything like that of the chloride. It cannot, therefore, of itself be used as a molding resin, but curiously enough it easily wets or clings to surfaces, acting as an excellent bonding material. In fact, it is used as a binder in composition wood molding; as an adhesive for sealing fiber cartons; for making milk bottle caps; gumming tapes, etc. For especially sticky coatings plasticisers are used.

These acetate polymers burn very slowly with a smoky flame. They are colorless, tasteless, odorless, non-toxic but quite thermoplastic. They are not affected by water, aliphatic hydrocarbons, the higher alcohols, etc., and have an excellent resistance both to light and heat maintaining their clarity even after long exposure to either.

Blending

Considering the remarkable properties of these two resins it might be thought that by carefully blending a series of resins would result in combining the attractive features of both, but unfortunately such is not the case. Even under the best of intimate mixing only weak, brittle or indifferent products result. When, however, the vinyl chloride and vinyl acetate are simultaneously polymerized, chloro-acetate resins result whose composition depends upon the predetermined proportions in which the ingredients are mixed. In fact, the reaction proceeds in such a way that the vinyl acetate can be said to internally plasticise the vinyl chloride and the degree of plasticization can be controlled by varying the ratio of the two before polymerization. This type of plasticization is, of course, quite different from the usual type in which external plasticisers are used which are usually high boiling liquids, waxes, gums, etc. In many cases such external plasticisers are still essential but the resins so plasticised are always subject to a change in composition due to a loss of the plasticiser by evaporation, oxidation or solvent extraction.

*Paper presented before the N. Y. Section of American Association of Textile Chemists and Colorists, January 26, 1940.

Industrial Uses

Of the various copolymers investigated only those containing 85% or more of vinyl chlorde seem to have particular industrial interest, although there is one containing from 65-70% vinyl chloride which is of interest in the coating field. This has an average molecular weight of only 4,000 to 6,000 and because of its high acetate content is compatible with nitro cellulose. The resulting mixture provides a coating which is superior to either product by itself. Other coating polymers contain 85-86% of the chloride, but of greater interest is the next higher series with 86-87% chloride and molecular weights ranging from 8,500-9,500. The polymer in this case is large enough to give excellent toughness to the film while yet small enough to permit good solubility.

For compression molding, resins with 85-88% vinyl chloride are used having an average molecular weight of 12,000-13,000 while for the manufacture of plastic sheets where outstanding strength and toughness are required a resin with 88-90% vinyl chloride is used with an average molecular weight of about 15,000-16,000.

This brings us to Vinyon, the new textile fiber.

Vinyon

In making the multifilament yarn, the raw copolymer in the form of a white power, is dispersed in acetone to get a dope containing 23% of the copolymer by weight. After filtering and deaerating the dope is spun the same as acetate by the dry or air spinning process.

After conditioning on the take-up bobbins the yarn is wet twisted to avoid static with 6 turns per inch whereupon it is given a stretch of over 100% of its original length.

As in the case of nylon this stretching is a vital part in producing a good yarn so as to give it the high tensile strength and true elasticity. The stretched yarn is then set by immersion in water at 150° F. for several hours, after which it is ready to be wound to cones or skeins as the case may be.

The ordinary yarn is bright but may be dulled by incorporating finely ground pigments in the spinning dope just as is done in the case of viscose or acetate.

Tenacity and Elongation Control

The tenacity may be controlled within a range of 1.00 to 4.00 grams per denier and the elongation correspondingly from 120% to 18%, the higher strength corresponding to the lower extensibility and vice versa. Being extremely water repellent the tenacity and extensibility of the dry and wet yarn are the same. For convenient comparison we give the following table:

	Dry		Wet	
	Tenacity	Elongation	Tenacity	Elongation
" No. 2	2.30	25	2.30	25
" No. 2	2.30	25	2.30	25
Degummed silk	4.22	16%	3.40	26%
Viscose	2.00	18	1.00	28
Acetate	1.40	27	0.85	36
Vinyon No. 1	4.00	18	4.00	18
" No. 2	2.30	25	2.30	25
" No. 3	1.00	120 plus	1.00	120 plus

(*Continued on Page 31*)

Personal News

W. Preston Dunson has succeeded E .B. Shaw as superintendent of the American Thread Co., Dalton, Ga.

L. N. Hale is now production manager of the Drayton Mills, Spartanburg, S. C.

J. W. Houth has succeeded M. Bulford as superintendent of the Clearwater Mfg. Co., Clearwater, S. C.

C. A. Porter has succeeded W. W .Scott as superintendent of Gardiner-Warring Co., Florence, Ala.

T. L. Edwards is superintendent of the Profile Cotton Mills, Jacksonville, Ala.

Ed Vaughn has succeeded T. E. Hirsh as superintendent of the Lawler Hosiery Mills, Dallas, Ga.

H. R. Hart is vice-president in charge of production at the Southern Brighton Mills, Shannon, Ga.

R. N. Fickett, Jr., secretary of the Fickett Cotton Mills, Whitehall, Ga., is also acting as superintendent.

F. J. Fitchner is superintendent of the Corinth Hosiery Mills, Inc., Corinth, Miss.

B. P. Henry is now superintendent of the Dalla-Noval Yarn Mill, Dallas, Ga.

H. T. Ward is now secretary of the Granite Hosiery Co., Granite Falls, N. C.

C. D. Jay has succeeded C. M. Hall as superintendent of the Georgia Hosiery Mill, Blakely, Ga.

A. M. Stack is secretary and treasurer of the new Alamance Hosiery Mill at Graham, N. C.

Jack L. Underwood is now overhauling the spinning department at Pomona Mfg. Co., Greensboro, N. C.

A. H. Eastwood has succeeded Robt. Y. Button as president of the Culpepper (Va.) Textile Mills.

Leon Ormsby is superintendent of the recently organized Scotland Sheeting Mills, Laurinburg, N. C.

R. L. Sauls is superintendent of the recently organized Hudson Narrow Fabric Mills, Easley, S. C.

J. C. Jolly, formerly of Kings Mountain, N. C., is now superintendent of the Mayo Mills, Inc., Mayo, N. C.

Wm. H. Shumate has become superintendent of the Cutter Mfg. Co., Rock Hill, S. C.

T. A. Hightower, manager of the Kendall Co., Edgefield, S. C., has recently been elected president of the Edgefield County Men's Business Club.

E. M. Deal is now president of the New City Mills, Newton, N. C.

R. H. Singleton has succeeded James Hawes as manager of the Icard Cordage Co., Icard, N. C.

Herbert Goldberg has succeeded T. P. Taylor as superintendent of the Aldogon Mfg. Co., Belmont, N. C.

J. H. Nichols has resigned as superintendent of the spinning department of the Ottaray and Monarch units of Monarch Mills, Union, S. C.

J. C. Barnwell has been promoted from speeder hand to section man in the card room at the Ninety-Six (S. C.) Cotton Mill.

Joe Balloch has succeeded C. L. Eddy as superintendent of the Renfrew Bleachery, unit of the Brandon Corp., at Travelers Rest, S. C.

H. F. Graham, formerly with Judson Mills, Greenville, S. C., is now overseer of weaving No. 1, Brookside Mills, Knoxville, Tenn.

L. C. Leagan has been promoted from second hand on the first shift to assistant overseer of carding at the Ninety-Six Cotton Mills, Ninety-Six, S. C.

Jos. W. Valentine, of New York, has become president of the Florence Cotton Mills, Florence, Ala. W. A. Enloe is treasurer.

Sam Horne has been promoted from section man to second hand in the carding department at the Ninety-Six (S. C.) Cotton Mill.

J. H. Mayes, general manager of the Fitzgerald (Ga.) Cotton Mills, has been re-elected president of the Fitzgerald Federal Savings and Loan Association.

J. W. Rowell, formerly with Cherry Cotton Mills, Florence, Ala., has been named overseer of carding and spinning at the Floyd Mills, Rome, Ga.

L. S. Crain is overseer of weaving No. 1 on second shift at Brookside Mills, Knoxville, Tenn. He was formerly with the Drayton Mills, Spartanburg, S. C.

M. F. Springfield, formerly overseer of weaving at the Springs Cotton Mills, Kershaw, S. C., is now superintendent of weaving at the Nos. 1, 2 and 3 weave rooms of the Brookside Mills, Knoxville, Tenn.

C. A. Davis, for the past five years connected with Marshall Field & Co., Spray, N. C., has resigned to accept the position of general manager and vice-president of Spencer Mountain Mills, Gastonia, N. C. Before going with Marshall Field, Mr. Davis was superintendent of the Pilot Mills, Raleigh, N. C.

Bill Friday, son of the manager of the Cocker Machine & Foundry Co., Gastonia, N. C., is a member of the staff of the N. C. State College paper, *The Technician*.

C. B. Heath, president of Manetta Mills, Lando, S. C., and Monroe, N. C., has been re-elected a director of the Peoples National Ban kof Chester, S. C.

A. E. Rhash has succeeded Charles Rampp as superintendent of the Alamac Hosiery Mills, Reidsville, N. C.

J. W. Keziah is superintendent of the Monarch Hosiery Mills, Burlington, N. C.

J. Holmes Davis has become chairman of the board of directors of the Spofford Mills, Wilmington, N. C., and been succeeded as president by his son, J. Holmes Davis, Jr.

O. H. Dunn, formerly superintendent of the Sycamore, Ala., plant of Avondale Mills, has been made general superintendent of the plants of the Avondale Mills at Sylacauga, Ala.

G. S. York has been promoted to the position of superintendent of the Superior Yarn Mills, Long Island, N. C.

Joseph Oberhauser is now superintendent of the Charlotte plant of Albert J. Bartson.

Raymond H. Chase has been promoted from assistant treasurer of the Spindale Mills, Spindale, N. C., to vice-president and treasurer.

Joseph L. Barnett has been elected as secretary of the Dixon Mills, Inc., and Trenton Cotton Mills, Gastonia, N. C., succeeding Kay Dixon, who held the position for a number of years.

Albert Breen With Emmons

Albert Breen recently became associated with the Emmons Loom Harness Co., Lawrence, Mass., and Charlotte, N. C., as Emmons' sales representative in Michigan, Indiana, Illinois, Ohio, Wisconsin, Minnesota, Missouri, Iowa and Kentucky.

Well known in the industry, Mr. Breen's wide experience with the problems of practical weaving is expected to prove helpful to midwestern mills. His address is 80 East Jackson Boulevard, Chicago, Ill.

A. G. Myers Has An Emergency Operation

Albert G. Myers, president of Textiles, Inc., Gastonia, N. C., underwent an emergency appendix operation January 21st at the Church Home and Infirmary in Baltimore.

Mr. Myers was on a business trip to New York and Baltimore when stricken with the attack. He stood the ordeal well and his condition is regarded as satisfactory.

Bill Barnhardt Elected Director of Commercial National Bank

William H. Barnhardt, of Barnhardt Bros., widely known sales agents for knitting and weaving yarns, with headquarters in Charlotte, was elected a director of the Commercial National Bank of this city, at the last annual stockholders' meeting.

The Commercial National Bank was founded in 1874 and its present assets total more than $15,000,000. In point of continuous operation, it is said to be the oldest national bank in North Carolina, and with the election of Mr. Barnhardt, now has on its board probably the youngest director of any similar institution in the State.

Mr. Barnhardt is also a director of the following companies: R. S. Dickson & Co., one of the largest distributors of stocks and bonds in the Southeast; the Elmore Corp., of Spindale, N. C., and the Ranlo Mfg. Co., of Gasttonia, N. C. He is vice-

president and secretary of Tryon Processing Co., Tryon, N. C., manufacturers of space dyed resist yarns that are sold throughout the United States and Canada and are being exported to other countries.

Notwithstanding his many business interests, "Bill" has always found time to take an active part in the religious and civic life of his city, and at present is a deacon and chairman of the stewardship committee of the Myers Park Presbyterian Church, a director and chairman of the finance committee of the Charlotte Y. M. C. A., and a member of the executive board of the Mecklenburg County Boy Scouts of America.

Manufacturers of yarns for which Barnhardt Bros. are sales agents in the Southern territory include: Tryon Processing Co., Tryon, N. C.; Friedberger-Aaron Co., Philadelphia; Imperial Rayon Co., Philadelphia; the American Silk Spinning Co., Pawtucket, R. I.; Greenriver Mills, Tuxedo, N. C.; King Cotton Mills Corp., Burlington, N. C.; Adamson Bros Co., New York.

Emmons Issues New Catalog

The complete line of textile specialties manufactured by Emmons Loom Harness Co., of Lawrence, Mass., and Charlotte, N. C., is covered in an eight-page catalog just released.

Among the products manufactured by this 72-year-old firm and described in this catalog are certified steel heddles, harness frames, twine harness, mail-eye harness, Jacquard heddles, loom reeds, warper and lease reeds, slasher combs, Wadwell loop and doll pickers and related products.

The entire line is manufactured under a system of quality control which includes rigid inspection of all material, operations and finished products, according to the company. An "inspected and improved" seal is now attached to shipments of Emmons products.

OBITUARY

SOLOMON G. TOUCHSTONE

Columbia, S. C.—Solomon G. Touchstone, 65, died suddenly from a cerebral hemorrhage at his home January 8th. For the past 24 years he was overseer of carding at the Gramby Plant, Pacific Mills.

ARTHUR A. MOFFITT

Arthur A. Moffitt, sales representative in the New England territory for Howard Bros. Mfg. Co., manufacturers of card clothing, died Wednesday, December 20th.

Mr. Moffitt had covered the territory for 18 years, and during that time had made a host of friends in the mill business.

B. P. ODOM

Statesville, N. C.—Benjamin P. Odom, 65, for many years prominently identified with textile manufacturing in North Carolina and South Carolina, died January 21st at his home here. He had been in declining health for nine years, suffering with a heart ailment, and had been seriously ill for three weeks. He removed to Statesville from Kings Mountain eight years ago.

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Contributions on subjects pertaining to cotton, its manufacture and distribution, are requested. Contributed articles do not necessarily reflect the opinion of the publishers. Items pertaining to new mills, extensions, etc., are solicited.

Fifty-Sixth Edition

We are completing the data and will soon go to press with the Fifty-sixth edition of Clark's Directory of Southern Textile Mills, which will be dated January 1st, 1940.

We have published this Directory for 28 years and not only is the information better arranged but it is more accurate and reliable than other directories of a similar nature. The accuracy of information is due to some extent to the fact that we cover only the Southern area and are thoroughly familiar with its textile plants.

We recently had occasion to check the information contained in Clark's Directory of Southern Textile Mills with three other textile directories and we were well satisfied with the comparison.

We realize that many firms and individuals use a textile directory as the basis for a mailing list and that errors mean unnecessary expense through waste of stamps.

We take pride in the accuracy of Clark's Directory of Southern Textile Mills and the service which it renders to salesmen and others connected with the textile industry.

It includes not only cotton mills, but rayon, silk, woolen mills, dyeing and finishing plants and manufacturers of knit underwear, seamless hosiery and full fashioned hosiery.

Dies Committee Continued

Communists and friends of communists, including the American Civil Liberties Union, made a very determined effort to prevent a continuation of the Dies Committee on un-American Activities and quite a storm arose on the floor of the House, but when the vote was taken and Congressmen faced the problem of being recorded upon the side of the communists, the resolution was passed by a vote of 324 to 21.

The fact that only 21 Congressmen were willing to be found upon the side of the communists is a good sign, because Congressmen usually learn the sentiment of their constituents and vote accordingly.

Woozy in the Head

John L. Lewis describes Secretary of Labor Frances Perkins as being "woozy in the head" and while we regret to be found upon the same side as Mr. Lewis we will have to agree.

He said further:

> I don't think she knows any more about the economic problems of this country than a hottentot does about the moral law.

Again we will have to agree with him, but it appears to us to be a case of the pot calling the kettle black, after having been a friend of the kettle for several years.

John L. Lewis is himself "woozy in the head" if he pictures himself as a future "American Hitler" and thinks that the people of America will ever be subjugated by him.

He is assuming the role of common "scowl" and passing around compliments to many persons but his rantings have not made a very good impression upon the public mind.

The Whittemore Report

Chas. W. Whittemore, trial examiner for the National Labor Relations Board, recently made a report which stamped him as a worthy employ of the most contemptible political organization which has existed under our Government.

Mr. Whittemore slandered the Square Deal Club of the Alma Mills, Gaffney, S. C., when he characterized them as "thugs," "religious fanatics" and "characters right out of Tobacco Road."

The offense of the good people of the Alma Mills, which brought forth the vituperations and insults of Mr. Whittemore, was that they decided to organize a union of their own and thought that as free citizens of the sovereign

Spending of American Presidents

(Reprint from New York Sun)

This table sets forth the complete financial record of every President of the United States from the adoption of the Constitution in 1789 to date. The figures given up to 1939 show the actual receipts, expenditures and deficits recorded in the annals of the Treasury Department and certified to Congress in the annual report of the Secretary of the Treasury. Figures for 1940 and 1941 are the estimate presented to Congress by President Roosevelt in his recent budget message.

The totals show that Franklin D. Roosevelt, in eight years, has spent 58½ per cent as much as all of his predecessors put together in 144½ years. He received in taxes in these depression years 44 per cent as much as all of his predecessors together have collected, and he has almost exactly doubled the national debt.

President	No. of Fiscal Years Served	Receipts	Expenditures	+ Surplus or — Deficit	Public Debt at End of Administration
George Washington	8	$ 32,665,765	$ 34,088,506	—$ 1,422,741	$ 83,762,172
John Adams	4	34,984,839	34,262,668	+ 722,171	82,976,294
Thomas Jefferson	8	113,400,835	72,424,289	+ 40,976,546	65,196,318
James Madison (War of 1812)	8	130,311,080	176,473,974	— 46,162,894	127,334,934
James Monroe	8	171,895,953	147,237,899	+ 24,658,054	90,875,877
John Quincy Adams	4	94,831,286	65,427,037	+ 29,404,249	67,475,044
Andrew Jackson	8	252,061,371	152,969,098	+ 99,092,273	336,958
Martin Van Buren	4	102,219,579	122,325,262	— 20,105,683	5,250,876
*Harrison and Tyler	4½	104,430,540	108,904,688	— 4,474,148	15,925,303
James K. Polk (Mexican war)	4	123,139,658	175,477,220	— 52,337,562	63,061,859
Zachary Taylor	1	43,603,439	39,543,492	+ 4,059,947	63,452,774
Millard Fillmore	3	163,993,174	140,088,047	+ 23,905,127	59,804,661
Franklin Pierce	4	282,172,928	255,154,264	+ 27,018,664	28,701,375
James Buchanan	4	197,716,370	272,933,490	— 75,217,120	90,582,417
Abraham Lincoln (Civil war)	4	763,026,123	3,352,380,410	— 2,589,354,287	2,677,929,012
Andrew Johnson	4	1,825,248,460	1,578,557,655	+ 246,690,805	2,545,110,590
U. S. Grant	8	2,670,905,586	2,253,386,783	+ 417,518,803	2,107,759,903
Rutherford B. Hayes	4	1,225,899,968	1,032,268,057	+ 193,631,911	2,019,285,728
Garfield and Arthur	4	1,474,023,408	1,027,742,757	+ 446,280,651	1,578,551,169
Grover Cleveland (1st dm.)	4	1,474,159,137	1,077,629,099	+ 396,530,038	1,249,470,511
Benjamin Harrison	4	1,536,450,844	1,412,315,899	+ 124,134,945	961,431,766
Grover Cleveland (2nd adm.)	4	1,316,948,887	1,441,674,184	— 124,725,297	1,226,793,713
William McKinley (Spanish-American war)	4	2,076,208,146	2,093,918,534	— 17,710,388	1,221,572,245
Theodore Roosevelt	8	4,676,747,962	4,655,450,515	+ 21,297,447	1,148,315,372
William Howard Taft	4	2,794,065,060	2,799,211,874	— 5,146,814	1,193,047,745
Woodrow Wilson (World war)	8	24,375,781,688	46,938,260,143	— 22,562,478,455	23,976,250,608
Warren G. Harding	2	8,116,239,632	6,667,235,429	+ 1,449,004,203	22,349,687,758
Calvin Coolidge	6	23,959,941,899	18,585,549,136	+ 5,374,392,763	16,931,197,748
Herbert Hoover	4	11,453,002,513	15,490,476,656	— 4,037,474,143	22,538,672,164
Franklin D. Roosevelt	8	40,089,857,957	65,628,526,692	— 25,538,668,735	44,938,577,622
Total of all Presidents up to F. D. Roosevelt			367,065	—$20,617,290,935	$22,538,672,164
			393,757	—$46,155,959,670	$67,477,249,786

ent Tyler, however, it was changed to run from July 1, to the

lma Mill preferred their own union basted them with calumny and in-

Whittemore has shown himself to be and contemptible liar.

to use this term upon our editorial e other fits him under the circum- if we have "done him wrong" he redress.

Mill News

McMINNVILLE, TENN.—The Tennessee Woolen Mills are now in process of liquidation.

GREENVILLE, S. C.—Victor-Monaghan Co., Monaghan Plant, has recently completed installation of 564 new looms equipped with K-A Electrical Warp Stops.

RED SPRINGS, N. C.—Red Springs Weaving Co. has the 576 looms being installed at their mill equipped with K-A Electrical Warp Stops.

GASTONIA, N. C.—The Gastonia Combed Yarn Corp. has added 22 spinning frames of 220 spindles each, which increases their total number of spindles to 39,420.

TAYLORS, S. C.—Norris Mfg. Co., of Taylors, was chartered January 2nd to manufacture garments from cotton, rayon and wool. Capitalized at $100,000, the concern listed G. F. Norris as president and treasurer and G. Freeman Norris, Jr., as vice-president and secretary.

ORANGE, TEX.—Announcement is made that a plant for the manufacture of awning for the Texas Awning Co. is being established by Provost Bros., of Beaumont, in the Molley Building, 402 Eleventh street, this city. The new plant will be ready for operation at an early date, it is announced by the management.

MAYO, S. C.—The Mary Louise Mill, at Mayo, closed for several years, will resume operations early in February, J. A. Neisler, of Kings Mountain, N. C., announced. Machinery installations are about complete, and raw cotton is being received at the plant for the opening. Yarns made there will be shipped to the Neisler plant at Kings Mountain for final procesing.

GREER, S. C.—At the Greer and Victor
units of the Victor-Monaghan Co., work wa
completed on the installation of long draft spinn
ment. The company likewise changed the card
chinery from three-process roving to two-p
draft, and has changed the 7½-inch warp bob
inch. The humidifying systems have been re

BREWTON, ALA.—Announcement has be
of the consummation of a contract with
Ribbon Corp. of Stroudsburg, Pa., for the
unit here in the building formerly owned b
Silk Mills Corp. The silk mill property
chased from the Reconstruction Finance
000, by the Brewton Development Corp.
that the payroll for the new corporation
$50,000 annually.

Only weaving will be done at this plant

COWPENS, S. C.—An order recommending acceptance of a $47,500 bid of George Norwood, of Greenville, for the Cowpens Mfg. Co. plant and property has been signed by C. E. Daniel, referee in bankruptcy.

The Cowpens property is now closed. Recent attempts at reorganization and reopening failed and the company was placed in bankruptcy.

CEDARTOWN, GA.—Cedartown Textiles, Inc., has added a new Erie 330 H.P. water tube boiler which is gas fired and automatic, a new chimney and complete boiler room equipment, in addition to the Philadelphia high speed tenter dryer which was recently installed. The company has also installed a small piece kettle to take care of smaller sets.

WINCHESTER, VA.—Sixteen looms have been installed in the Clearbrook Woolen Co., Inc., here and have gotten well into production in the manufacture of women's sportwear materials in wool. The new company was recently capitalized at $50,000. This plant was formerly the Brucetown Woolen Co., and, when purchased by William H. Lawrence, Jr., formerly of Chambersburg, Pa., the plant had not operated since May, 1938.

ELDORADO, TEX.—A large textile plant, the first woolen mill to be located in the heart of the wool and mohair growing section of this State, will be built here by the recently organized West Texas Woolen Mills. J. M. Christian, textile engineer, will be manager of the new industry. The wool stocks for the proposed plant will be processed through the preliminary stages by the new wool scouring plant of the Cen-Texas Wool & Mohair Co., which is being constructed at San Marcos.

NEWTON, N .C.—The Carolina Mills Co., at Maiden, has purchased the Cayuga Linen and Cotton Mills, of
, and plans to open a new mill unit at Newton,
has announced.
plant will be moved to the
Newton, the

Mill News

SMITHFIELD, N. C.—The Smithfield Hosiery Mills have closed down permanently and gone out of business.

LANDIS, N. C.—The Corriher Mills Co. have purchased the machinery for an addition.

HARTSVILLE, S. C.—The Hartsville Cotton Mills are changing all of their spinning to SKF paper tubes. The new spindles are being supplied by the Saco-Lowell Shops.

ROCKINGHAM, N. C.—The Hannah Pickett Mills have placed an order with the Saco-Lowell Shops under which 144 warp frames will be changed to long draft.

MCCOMB, MISS.—The Berthadale Mills, which operated 50 looms on drapery and upholstery fabrics, has closed down permanently and the machinery is being sold.

MURPHY, N. C.—B. G. Brumby, Jr., of Hickory, N. C., has established a plant at Murphy for cutting and selling hosiery tops to mountain people engaged in the manufacture of hook rugs.

CORNELIUS, N. C.—The Gem Yarn Mills have recently modernized their spinning room and also enlarged same. They discarded 1,632 spindles and added 2,248, which increased their capacity to 11,384 spindles.

ENGLEWOOD, TENN.—W. P. Chestnutt, of Englewood, is preparing to start a new hosiery mill in the old Englegood Mfg. Co. plant. The mill will produce children's and infants' hosiery.

WINONA, MISS.—The Aponaug Mfg. Co., located just south of Winona, was destroyed by fire recently at an estimated loss of $200,000. The plant had been operating two shifts a day and has over 300 employees.

SHELBY, N. C.—Fire of undetermined origin destroyed a warehouse of the Belmont Cotton Mills, together with an adjoining room filled with general mill supplies on January 21st.

LAURINBURG, N. C.—The Scotland Sheeting Mills, Inc., are operating 140 looms upon 90 to 99-inch sheetings. Edwin Morgan, of Laurel Hill, N. C., is president, H. M. Jones is treasurer and Leon Ownsby, superintendent.

LINCOLNTON, N .C.—The Wampum Mills, which had been partially dismantled, are being re-equipped with machinery purchased from the Wiscassett Mills, at Albemarle, N. C., and a mill at Chattanooga, Tenn. They will have 15,256 spindles on 50's to 60's yarn. New flooring is being put down.

EASLEY, S. C.—The recently organized Hudson Narrow Fabrics Mills will operate seven looms upon tapes, webbing and narrow fabrics. Edgar C. Martin, of Greenville, S. C., is president and treasurer.

UNION, S. C.—The recently organized Unity Hosiery Mills, Inc., will operate eight full fashioned machines on ladies' and men's hosiery. E. F. Hartman is president and H. P. Hartman is treasurer.

BRENHAM, TEX.—The Brenham Cotton Mills, Inc., have been acquired by the same group who own the Bonham Cotton Mills. Herbert A. Burow, of Bonham, will also manage the plant at Brenham. Geo. Hugeley will be superintendent.

LURAY, VA.—E. W. Louck, chairman of the industrial committee of the Luray Chamber of Commerce, said that more than 500 persons had registered in the labor survey being conducted to determine the available workers for a large textile industry planning to begin construction of a plant in Luray in March.

SOUTH BOSTON, VA.—J. E. Sirrine & Co., Greenville, S. C., consulting and designing engineers, have let three special contracts for the new 480-loom rayon weaving plant of the Carter Fabrics Corp., of South Boston, one to Adams Electric Co., of Reidsville, N. C., for the installation of the lighting and power wiring; one to Grinnell Co. for outside fire protection and sprinkler equipment; and the other to C. M. Guest & Sons, of Anderson, for the steam piping contract.

SPARTANBURG, S. C.—Reflooring of a major portion of the No. 1 plant of Spartan Mills has been authorized.

The work is to cost $8,000, according to specifications in the permit.

The Fiske-Carter Construction Co. holds the contract for the work.

Reflooring of the No. 1 plant is one in a series of recent projects in the modernization program of the Spartan Mills. Other projects include the installation of new machinery and other construction and repair work.

SWEETWATER, TENN.—A new hosiery mill, Hose, Inc., is opening in the old Lorraine Mill Building here. Incorporators are J. R. Sizer, F. L. Kinney and L. H. Wilhite. The charter authorized 600 shares of common stock at $25 par and 200 shares of $25 preferred stock.

Edwin Sizer, for several years superintendent of a hosiery mill at Spring City, Tenn., will be in charge of production.

The mill building has recently been redecorated and the mill is to be equipped to manufacture several types of hose.

MASTER MECHANICS' SECTION

AT the last meeting of the Northern Master Mechanics' Division of the Southern Textile Association, Mr. A. C. Morrison, superintendent of the meter division of the Duke Power Co., Charlotte, N. C., made a short talk on Electric Demand Metering. This talk was omitted in the report of the meeting, due to lack of space, and is given below:

The Electric Demand Meter

A. C. Morrison, Supt. Meter Dept., Duke Power Co., Charlotte: Mr. Chairman, fellow members of the Master Mechanics' Division, and visitors: I want to take this opportunity to thank the committee for giving me this chance to come and speak on the subject of electric demand metering. I only hope that I can do half the justice to it that Mr. Marshall Lake did in an article he wrote which was published in the TEXTILE BULLETIN in September, 1938. Those of you who have read the article know exactly how well he went into detail. This morning I have with me the apparatus of which he spoke in that article.

We all know that since ancient times men have had commodities for sale, and in order to sell a commodity there has had to be some means of measurement. You know that as we read the Bible we run across such words as "firkin." That was a unit of measurement of quantity. The cubit was a measure of length. We today refer to the quart and the yard and so forth for our units of measurement of quantity and length.

The ancient peoples, of course, did not have what we have in standards. They had what they referred to as standards, but it has been only in the comparatively last few years that we have set up standards in the Bureau of Standards by which we know what standards really are. Those of you who have had opportunity to go into the Bureau of Standards in Washington have perhaps gone into one section of it where is kept the standard yard. That has been put on a piece of metal that has a very low coefficient of expansion and which is kept in a temperature varying probably only a small fraction of a unit. Since that is our standard, we have something by which to measure everything. Suppose your wife sent you down to the store, telling you to buy some cloth. When you go in you say to the saleswoman: "I want 20 yards of such-and-such cloth." The first thing she does, of course, is to measure it off on the counter. What is she doing? She is measuring it by a standard. Or suppose your wife tells you she wants ten pounds of potatoes. You walk into the groceryman's and get him to weigh you out ten pounds. On the way home you think you had better get some gas and you stop at a filling station, where you buy ten gallons of gas. In those two instances you have the pound and the gallon as units of measurement.

I am going to steal a little thunder from somebody else. A man, in making a talk, said he was going to show his hearers how vitally measurements affect our daily life, and he did so by reading from a newspaper. So I pick up this paper here, which happens to be the *Charlotte Observer* for this morning. The very first thing I read is "Saturday, November 25, 1939." There we have a measurement of time. Next let's read some war news. We see that a British ship of 7,000 tons has been sunk by the Germans, with a loss of 20 lives. There is a unit of measurement, the tonnage of a ship. It is the same way with anything we take up; there is something about measurement in it. Consequently measurements and standards affect our lives very, very much.

Whenever we have any commodity such as electricity to sell it is necessary that we devise some means of measuring that commodity. How do we do it? We do it simply by devising a watt-hour meter, one of which I have here. There are a number of these on the market, all of which are about the same. Each manufacturer, of course, thinks that his is the best, but they are all good. They do a good job. In fact, they do such a good job that this particular watt-hour meter here does several jobs which a watch costing more will not do. For instance, here is a watch that cost a few dollars more than this meter. It does only one thing; it measures time, and that is all it will do. Here is a meter that will take into consideration not only time but which will measure kilowatt-hours and within a certain limit certain variations of frequency, variations of load, variations of power factor. It takes all those things into consideration and sums them up correctly and accurately.

We are all interested in the demand and how we might keep it down. I will try to explain to you the operation of the demand indicator and how to keep down demand. That is your problem. Some things can be done to help.

The operation of a demand meter is simply this, that in this register there is a small motor, which I hold in my hand now. It is geared to another part of the register on the inside and carries over a cam once in every 30 minutes. These meters are equipped for 30-minute intervals. Some of them are equipped for 15, but not, generally speaking, on our system.

What do we mean by a 30-minute interval? It simply means that this little meter carries over this cam every 30 minutes and pushes up this red pusher arm. That is the function of the motor alone; it simply carries this device up and resets it. The pusher arm then drops back.

I should like to draw a diagram on this blackboard here to illustrate how the meter gets its demands. Now I take a load from the graphic strip chart and draw a line on here to indicate it. You see it is full of peaks and depressions. In the 30-minute period this pointer will not pick out this highest peak here as the highest demand in this period of time. It does a much better job than that.

It goes in and mechanically takes into consideration an average of all these peaks in the stated interval. As I say, it does not take the highest point in a 30-minute period but takes the average during that time, and that is the maximum demand which this little pointer will get to, and that will not be exceeded unless the demand is increased.

As you notice, every one of these demand meters has some multiplying constant on it. That is there for a reason. In order not to build a meter as large as a house we simply build a multiplying constant in there.

A great many of you like to keep your daily readings on sheets, so that you can tell exactly what your consumption is from day to day, as well as your maximum demand. For this purpose we will furnish to those who would like to keep such a record some of these sheets which I have here. If any of you would like to have some after the meeting is over, come up and help yourselves, because one sheet, as you notice, will take care of your requirements for a month and will keep your maximum demand. If you watch what happens maybe you can find something in there that will keep your demand down. You might have a fire-pump motor that you would like not to have on when you have your maximum load. If you can use it on Saturday or at some other slack time, when it will not make you exceed your demand, why I would get it off and use it only at those times. You may find some other things that will enable you to keep your maximum daily demand down.

I have tried only to touch on the high places, so as to give the other fellows a chance. So I want to say that if you have any questions to ask while I am here I shall be only too glad to go into them, or if you would like to see me after the meeting I shall be at your service.

New Publication On Power-Factor

GEA-3225 is the number of a new publication by General Electric Co. entitled "Power-Factor and Its Improvement," which should prove of considerable interest to most master mechanics and electricians in textile mills of the South. Beginning with an explanation of power-factor, it explains power-factor improvement, rating of capacitors, adjustment rates, application of capacitors, calculatton of capacitor sizes, and a number of illustrations of applications.

Gear Powders

Many methods, such as casting, forging, rolling and extrusion, have been used to coax metals into the shape that is finally desired. In the past decade a new method, the compression of metal powder, has been added to the list and now forms the basis for a growing industry. Simplicity of fabrication is not, however, the sole reason for the increasing interest in metal powder technology. The powder method may be used to alloy metals which will not ordinarily alloy, to obtain greater accuracy of composition in the final product, to produce a porous final structure or to obtain many other qualities not possible with the continuous metals. Bars or rods compressed from metal powders can be worked to obtain sheets, wires and similar products with a close, uniform structure.

Almost all of the metals are now obtainable as powders, though of course at a wide variation in price. In general the powders are substantially more expensive than the corresponding solid metals and can be used only when processing economies offset the extra cost of the raw material. However, in the production of small, simple parts the speed of production and the savings in material occasioned by the elimination of machining often make the use of powder less expensive than the conventional use of the metal.

Many alloys are made by mixing their components in powder form. Stainless steel, for instance, may be produced by mixing iron, nickel and chromium powders, although it is necessary to heat-treat the product for a relatively long time and at a high temperature to disperse the three constituents. Brass powder is produced by heating a mixture of copper and zinc powder to a temperature close to the melting point of zinc. This is a diffusion method. Mixing the powders is not, however, a simple procedure; and, where there is a great difference in density between the materials to be mixed, it may require up to three or four days. Of late equipment has been developed which reduces the mixing period considerably.

An outstanding current problem in the art is the production of ferrous alloy parts which will have the hardness required in many uses. Ferrous alloy powders meeting the hardness requirements have offered serious molding difficulties. One solution to this dilemma has been to decarbonize the surface of the particles, thus producing a coating of soft iron, which permits the cohesion and welding of the powder under pressure. After forming, the product is heated and the carbon disperses uniformly, yielding a product of requisite hardness and having an unusually high tensile strength. This work opens a broad new field.

Probably some of the greatest advances in the utilization of metal powders have been in mold design and in the molding process. The quantity of powder delivered to the mold must be kept constant within minute limits in order to produce products which are accurately uniform. So successfully have the orifices through which the powder flows been designed that it is now possible to produce gears and other parts which require no further finishing. It has been determined that the shape of the particles, their size assortment and the apparent density have an appreciable influence on flow and that consequently great care must be exercised in the production of the powders. The fine powders, of course, contain large quantities of air which must be vented during the molding operation. The design of the vent, which must pass air but hold back particles sometimes finer than 400 mesh, has been a vexing problem but has been solved. Despite the difficulties encountered originally, production rates up to 1,500 parts per minute on a single press have been attained for simple parts, far exceeding the molding rate for plastics but not yet equaling that of pharmaceutical tablets.

Formation of large articles by holding is difficult, for the total pressures required become impracticably large. Aside from the increased cost encountered with high pressure, the size of the press becomes unwieldy, since the powder occupies three times the volume of the final product. Handling of such large volume requires elimination of a large quantity of air and demands impracticably close control of friction in order to secure dimensional accuracy. It is now possible, however, to fabricate larger

articles from strips formed by compressing the powder either alone or onto a solid base sheet. Some investigational work is now being conducted on compression under vacuum, whereby the required pressures may be reduced from 30 tons to some five tons per square inch.

The parts formed from powdered metals have diameters of up to eight inches; commutator rings are a good example. Gears, brake drums and clutch rings are typical products. Powder compression may be used to particular advantage in annular parts, since so much material is normally wasted in cutting the rings from sheets. The versatility of powdered metal products is well demonstrated by the use of a sheet made from aluminum powder on the leading edge of an airplane wing to prevent ice formation. The pores may be filled with wax, which prevents adhesion of the ice, or a liquid may be forced under pressure through the pores to prevent ice formation. The continual progress in mold design, the better appreciation of the factors involved in producing a satisfactory powder, and the advances in the utilization of iron powder combine to indicate greatly increased usefulness for metal powders in the future.—*Industrial Bulletin of Arthur D. Little, Inc.*

Pure Induction

Equipment for the surface hardening of steel parts by an induced high frequency current was commercially introduced about three years ago and has since attained rather wide use by manufacturers of products that must stand hard knocks. Originally intended for hardening the bearing surfaces of heavy duty crankshafts, induction hardening has been extended to lighter parts, such as camshafts and to such products as gears, tools and ice skates. Simpler than the cumbersome case-hardening process, induction hardening is reported to yield superior products.

Steel parts after the forging or other forming operation are generally relatively soft and, if they are to withstand wear, must be hardened by heating to the point where the atoms of the steel become sufficiently mobile to permit the carbon to become dispersed into the iron. After the carbon has become dissolved, the part must be cooled almost instantaneously by quenching or the carbon will revert during cooling to aggregates which give softness to the steel. Hardening must be limited to a small distance below the surface, since the hard form of steel is brittle and, if it comprised the entire crankshaft or axle, would give poor shock resistance. Induction treatment controls accurately both the depth and position of hardening.

The principle of high frequency induction hardening is simple. If placed in the field of an electric current the molecules of a piece of steel are magnetized and attempt to line themselves up regularly. If the direction of the current changes rapidly, as with high frequencies, the molecules must change their directions thousands of times each second, and in attempting to do so they generate heat. Induced eddy currents also contribute to the heating effect. High frequency current travels mainly on the surface and hence heats the surface of a piece first. However, as the steel reaches a high temperature it loses much of its responsiveness to high frequency current and the effect of the current penetrates further down into the steel. Thus by a control of frequency and time of treatment it is possible to control accurately the maximum temperature reached by the treated part and also the depth of heating. In practice the current is induced by a coil-containing ring which fits around, but does not touch, the part to be treated. Water jets which are built into the ring quench the treated part as soon as the heating is ended. So well may the incidence of heating be controlled that it is easily possible to harden a localized area while leaving the remainder of the piece soft and ductile.

Outstanding among the advantages of the process is its speed. Whereas the furnace treatment of large pieces often requires hours, the heating and quenching cycle in induction hardening requires a matter of seconds or less and in one hour, with two hardening machines and one operator, 30 large truck crankshafts may be treated. With smaller articles the production rate may run up to 6,000 parts per hour with one machine. The compactness of the equipment and the high output rate often permit treating to be inserted into the production line, thus eliminating transportation to a separate building. However, low operating cost must be balanced against investment in expensive and apparently rather specialized equipment.

The ease with which an electric current may be controlled makes for continuous uniformity in induction hardened parts. The process is automatic, once the controls have been set, and eliminates variability due to the operator. The depth of hardening may be predetermined accurately by regulation of the current, frequency and heating time. High frequency induction heating avoids the formation of scale and is reported to produce a fine-grained structure, harder than could be obtained from equivalent furnace heating. On the basis of service records reported thus far, the process would appear to offer significant savings to the user of hardened parts, as well as production advantages to the manufacturer.—*Industrial Bulletin of Arthur D. Little, Inc.*

V-Belt Industry Announces Revised Ratings for Multiple Drives

Milwaukee, Wis.—Based on studies of belt life made by Allis-Chalmers Mfg. Co. engineers, in conjunction with industry representatives, the power ratings of multiple V-belt drives have been revised to provide maximum belt life. Sheave diameters and correction factors are now standardized according to formulae based on results with multiple V-belt drives over a period of ten years. Overload factors are being arranged also to allow for the type of prime mover and driven machine.

The new ratings provide in many cases for a more compact drive and also for the longest belt life at the lowest initial cost.

Companies co-operating in the new standards include: The American Pulley Co., Browning Mfg. Co., Inc., The Dayton Rubber Mfg. Co., R. & J. Dick Co., Inc., Dodge Mfg. Corp., Fort Worth Steel & Machinery Co., The Gates Rubber Co., L. M. Gilmer Co., Goldens' Foundry & Machine Co., The B. F. Goodrich Co., The Goodyear Tire & Rubber Co., Inc., W. A. Jones Foundry & Machine Co., The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The Medart Co., Pyott Foundry & Machine Co., Rockwood Mfg. Co., United States Rubber Co., T. B. Wood's Sons Co., Worthington Pump and Machinery Corp.

Cloth Width—An Engineering Problem of the Cutting Trade

(*Continued from Page 9*)

of small to large pieces the tighter and closer the cutter can lay in the parts in a given yardage with less actual waste. In pants there are 2 large and 7 small pieces, in shirts 3 large and 6 small pieces. Even with wide cloth the small number of large and small pieces limits the field for the cutter. Where narrow cloth is used more parts must be pieced, the cutter must take more time to make and mark in the lay, and more machine operations are necessary. Thus, higher costs in the cutting room and factory prevail.

Three widths of cloth, two single and one double, are in common use. The two single widths have been increased from 28″ to 30″ and from 33″ to 36″, respectively, and the double width from 54″ to 58″ and 60″. Whether these widths are the most desirable ones from the standpoint of the clothing manufacturers is the question. The answer is far reaching in its interest because of the growing demand for recently developed light weight summer apparel for business and sports wear. A real opportunity for constructive study presents itself, not only to the clothing manufacturers but also to mills and machine builders that are woring on fabrics for this field.

This paper reviews a real problem of the cutting-up trades. The influence of cloth width upon apparel manufacturing costs has been indicated. In conclusion, an opinion, based on many contacts with the clothing industry, is offered as a guide for research with reference to the most suitable widths for various purposes.

Suitings	60″	instead of	54″
Trouserings	38″	″	″ 36″
Shirtings	38″	″	″ 36″
Overcoatings	60″	″	″ 54″
Melton Jackets	60″	″	″ 54″
Overall fabrics	29″	″	″ 28″
Trouser pockets	30″	″	″ 28″
″ ″	37″	″	″ 36″
Body Linings	37″	″	″ 36″
″ ″	41″	″	″ 40″
Silesia pockets	36″		″
Vest linings	41(	″	″ 40″
Canvas	22-24-28-40-44″		

Vinyon—A New Textile Fiber

(*Continued from Page 19*)

A tenacity of 4.00 grams per denier expressed in another way is 77,200 pounds per square inch which corresponds to the strength of machinery or forging steel.

Although the yarn is quite water resistant, as the table shows, the surface is readily wet out by the use of wetting agents. Although it is thermoplastic and softens at temperatures, it does not support combustion, but if heated hot enough will burn with a very smoky flame.

During textile processing it is well to run with rather high humidity because of the static which develops. The knitting properties are very good indeed, for Vinyon due to its high strength and elasticity can be knit under higher tension thus producing a tighter stitch than is possible with other fibers.

Resistant To Acids

The yarn and fabrics are in no way affected by water and are exceptionally resistant to acids and alkalis. Aqua regia, 70% nitric, hydrochloric and even hydrofluoric acid of maximum concentration do not attack it at room temperature. The same is true of caustic soda or potash.

The lower aliphatic ketones like acetones, dissolve it as do some of the halogenated hydrocarbons. In contact with di-thyl ether or the lower oromatic hydrocarbons it tends to swell; but it is unaffected by alcohol, gasoline and other aliphatic hydrocarbons. Vinyon is not attacked by bacteria, molds or fungi and will not support their growth. It does not conduct electricity and as water does not affect it, is an excellent insulator. Its high insulating power is shown by the ease with which it develops and retains the static charge. Its flexing strength and its stability to sunlight are excellent.

Dyeing Problem Being Solved

Dyeing of Vinyon seemed at first to offer some difficulty but this matter is well on the way of solution as a whole range of colors are already available. The yarn itself can, of course, be colored with pigments by incorporating these in the resin dispersion prior to spinning just as is done when the yarn is to be a dull yarn.

One way of dyeing the yarn is to use a bath containing solvents and non-solvents for the resin which temporarily swell the filaments. Another way is by means of many types of dyes using standard dyeing procedure modified, of course, as to temperature and by the use of a suitable dispersing agent for the dye. Still another way is to use oil soluble dyes applied from hydrocarbon baths.

Vinyon is at present being made in the following sizes and filament counts:

Denier	Filament	Price
60	46	1.80
120	92	1.65
180	138	1.50
250	184	1.45
In the unstretched state:		
180	46	1.35

Small amounts of staple have been made which are being tried out for various purposes. Uses which have been suggested for Vinyon are the following:

Filter fabrics, fish lines, nets, seines, electric insulation, shower curtains; bathing suits, waterproof clothing, acid and alkali resistant clothing, fireproof awnings and curtains, upholstery, fusible shape-retaining fabrics and hosiery.

The staple fiber of Vinyon blended with natural fibers like cotton or wool, or with rayon, can be made into fabrics which will retain a pressed shape, fold or crease.

These are but a few of the uses which are suggested for this new textile fiber.

There is one thought to be kept in mind with respect to this paper. The figures given here, while true at the time, should be viewed with some latitude, due to the fact that experimental work in all the various processes involved is still being done.

Index To Advertisers

Where a — appears opposite a name it indicates that the advertisement does not appear in this issue.

Classified Department

WANTED—Position as foreman or fixer. Practical experience in foremanship and fixing in spinning, spooling and twisting. Experienced on new as well as old models of machinery. Experienced on all counts and colors. High school graduate. Desire immediate change. References. Address "CM," care Textile Bulletin.

FOR SALE

One 20 spindle Lazenby Model T Junior Cop and Butt Winder with motor drive for 550 volts.

Address "550,"
Care Textile Bulletin.

WANTED—Job as overseer or second hand in carding. 18 years' experience on white and colored work. Also overhauler and erector of fly frames. Good references. Go anywhere. Married. Age 35. Strictly sober. Address "Overhauler," care Textile Bulletin.

Experienced Stenographer and Secretary

is seeking a position with a textile mill. Years of practical experience, several of which were with a large Southern knitting mill. Hard, conscientious worker. Best of rererences.

Address "F. H.,"
Care Textile Bulletin.

POSITION WANTED—Overseer of spinning, raised in the heart of the textile industry. Experienced on 76 different styles and numbers of yarn. Now overseer of large mill. Desires to make a change. No disagreement with present company. Wil furnish references and take any size job. I. C. S. graduate. Age 32. Married. Sober. Will go anywhere. Address "76," care Textile Bulletin.

FOR SALE

10 No. 90 Universal cop winders in excellent condition.

Address "No. 90,"
Care Textile Bulletin.

WANTED—Position as manager or superintendent of yarn mill. 20 years' experience running yarn mill, carded, combed and rayon. Good reference. Address "Manager-Supt.," care Textile Bulletin

PRIVATE DETECTIVES

For ethical legitimate cases undercover operatives for industrial plants, also civil, financial, insurance and domestic investigations. Dictograph tel-tap and camera service. No contract or retainer fee. Work on per diem basis only. Official and business references. "Our best advertisement is a job well done." Established 1918. Phone day or night or write Cundiff's Detectives, Inc., Lynchburg, Va.

FOR SALE—500 loom beams for 40" looms, 18" heads. Will sell beam barrels without heads. Excellent condition. Best offer gets them. Also quantity of short quill cans, and Draper Loom parts at one-third original cost. Draper 3-bank warp stop motions. E. H. Thomas, R. F. D. No. 1, Box 4, Greenwood, S. C.

POSITION WANTED as Boss Weaver or assistant to Superintendent, in wool or worsted cloth mill. Address "FI," care Textile Bulletin.

REPRESENTATIVE WANTED

Young man, textile school graduate, with practical mill and traveling experience preferred, to represent reliable manufacturer of weave room supplies in North and South Carolina.

Address "Representative,"
Care Textile Bulletin.

MAN with several years' experience on Barber-Colman spoolers and warpers and Abbott automatic winders desires job. Address "R-G," care Textile Bulletin.

WANTED—An overseer for a wool card room for a mill in the South. Must be experienced in wool and cotton blends. State education, experience and age in reply. Address "Wool-Card," care Textile Bulletin.

Rayon Shipments Make New Record

Shipments of rayon filament yarn by domestic producers during 1939 broke all records for the American industry. They are estimated as 30 per cent larger than those for 1939 and 20 per cent higher than those for 1936, the previous record year. Shipments of rayon staple fiber, including staple, were 88 per cent larger in 1939 than in 1938.

Hull Promises Probe Of Jap Cloth Imports

Washington, D. C.—An immediate investigation of Japanese cotton cloth imports was assured January 4th by Secretary of State Cordell Hull on the heels of complaints from North Carolina textile manufacturers against this rapidly growing source of competition.

In a letter to Representative H. P. Fulmer, of the Second South Carolina District, Secretary Hull declared that he was having the entire matter surveyed and would communicate with the Congressman as soon as the complete set of facts have been obtained.

Acting at the request of the print cloth group of the cotton manufactures in the Southeast, Representative Fulmer wrote the Secretary calling attention to the "current decided increase in imports of Japanese cotton goods into the United States, which is having a particularly severe effect on several print cloth constructions."

More than nine million yards of bleached goods were imported into the United States from Japan in October, "virtually demoralizing the market for this particular type of print cloth," Fulmer said.

Establishment of an import quota on such goods was suggested by the Congressman "to remedy this serious situation." This action is believed necessary in view of the fact that President Roosevelt already has increased the tariff on these goods to the limits allowed by law.

Choosing the Proper Ring Traveler

(*Continued from Page 10*)

of the roving and give an idea of the average condition throughout the room.

Work of the Traveler

Now that I have suggested a way or method of checking on the quality of the different makes and styles available for use, let us look a little more into the work that the travelers have to do and difficulties to overcome in order to give satisfaction and stay on the job.

Total Miles Traveled Per Hour

Taking for example a 10/0 traveler, which weighs 45 grains per 10 travelers, or 45 grains each, with the following information: Spindle speed 10,000 R.P.M.; diameter ring, 1¾ inches; warp yarn, 36s; front roll delivery, 358 inches per minute and empty bobbin diameter, ¾ inch. The traveler lag, when winding on first layer of thread = $358 \div 3.1416 \times \frac{3}{4} = 151.9$ revolutions and the traveler speed = 10,000 − 151.9 = 9848 R.P.M. The total miles per day of 8 hours allowing 3 per cent for stoppage =

$$\left(\frac{3.1416 \times 1\frac{3}{4} \times 9848 \times 60 \times 8}{63{,}360 \text{ inches per mile}}\right) \times 97 = 398.4 \text{ miles}$$

The miles per hour = 398.4 ÷ 8 = 49.8.

This is excellent speed for a passenger train to average, and presuming that the travelers are changed weekly, they have to travel around the ring 49.8 × 80 = 3984 miles in a week of 80 hours. If they run until they wear out and fall off, the total distance might be much longer. As the bobbins increase in diameter, the speed of the traveler also increases.

Comparison of Strain and Friction

While the traveler speed is slower on a small bobbin diameter, the strain on the yarn and friction of traveler is much greater. The table below shows the relative strain from a ¾-inch bobbin diameter to a full bobbin when the size of the ring is 1¾ inches. The figures for each diameter are arrived at by dividing the square of the ring diameter by the square of the bobbin diameter.

The Formula $\frac{\text{Diameter Ring}^2}{\text{Diameter Bobbin}^2}$

Bobbin Diameter	Square of Diameter Rings	Square of Diameter Bobbins	Relative Strain
¾″	3.0625	.5625	5.44
1 ″	3.0625	1.0000	3.06
1¼″	3.0625	1.5625	1.96
1½″	3.0625	2.2500	1.36

As it is not practicable to run the frame until the bobbins fill the rings; if they are built to 1⅝″ the relative strain at that point would be 1.16, which would put the average strain at 2.596 and the bobbin diameter 1.08 inches. If a condition of this kind existed from empty to full bobbin a traveler that would suit the empty bobbin would suit a full one, hence no separators would be needed. The above table also proves the necessity of keeping the diameter of the ring within the bounds of reason, to

suit the empty bobbins.

As an example: If instead of using a ¾-inch diameter bobbin and 1¾-inch diameter rings, as in the table, a ⅞-inch bobbin and 1⅝-inch ring be used, the relative strain and friction would only be $1\frac{5}{8}\times1\frac{5}{8}\div\frac{7}{8}\times\frac{7}{8}=3.54$, the difference being 5.44—3.54=.91, which is quite a reduction in strain on the yarn at the starting of a set especially when the ring rail is at the top of the bobbins, when strain and friction is greatest. A change of this kind would also effect a considerable saving in the amount of travelers used, due to the use of somewhat heavier travelers. It also would reduce end breakage when ring rail is at the bottom by reducing the ballooning and beating against the separator blades.

There is another reason for keeping the relative diameters of the bobbins and rings within the bounds of reason, which is the continuous variations of the twist from empty to full bobbin, and also from top to bottom of the traverse. The only argument against this practice is that small rings and large bobbins require more doffing and more stoppage, but this is a poor argument in my opinion, unless all other losses are reduced to a minimum, especially in some mills where a great many frames are stopped for one cause or another very nearly all the time.

Testing Company Develops Warm Tester

The United States Testing Co. has completed the building of a machine for measuring the warmth qualities of materials.

There has been a number of instruments developed in recent years for measuring the thermal conductivity or heat transmission of materials. Some instruments incorporated temperature changes and air velocity in their readings.

The machine on which experimentation work has just been completed, embodies the features of the present instruments plus a number of innovations established and perfected by the Testing Co. The warmth tester actually determines the warmth factor of materials under all types of conditions.

The warmth tester is of the guarded hot-plate type with duct systems equipped with blower, refrigerating unit, and heating coils, together with suitable control units so that a wide variety of weather conditions can be created and accurately controlled. The various units of the warmth tester are adjusted to give a weather condition above the upper exposed surface of the sample that is representative of those to which it will be subjected in the course of normal use.

Individual Automatic Control Now in Thermolier Unit Heaters

Built-in individual automatic control of both day and night-time temperatures is now provided in Grinnell Automatic "Thermolier" Unit Heaters, made by Grinnell Co., Inc., of Providence, R. I. The control is also easily added to existing unit heaters of any make, as it requires merely to be tied into the line at the heater itself, completely eliminating the high cost of special wiring, according to an announcement by the manufacturers.

Heart of the device is a bulb-type thermostat containing a solid liquid charge, mounted within the heater housing. Two pointers—one for day, one for night—are quickly adjusted over a 60° range by someone in authority and locked. Thereafter, day and night settings are made by a simple pull-cord control hanging from the heater. A special setting makes possible summer operation of the fan alone, under automatic thermostat control, without additional wiring or other changes.

Information on both the Automatic Thermolier embodying the new device, and on the low-cost control itself, will be sent on request by the Grinnell Co., Inc., Executive Offices, Providence, R. I.

Cotton Goods Markets

New York.—The week ending January 20th closed with more or less of a bang ,with some 25 to 30 million yards of print cloth selling during the closing sessions. For all of that week there has been intermittent bidding for several constructions at something less than mills were willing to take, and on Thursday one important buyer managed to get a sizable lot at his price, which tended to set off the market for a spurt Friday. However, as orders started moving the mills strengthened their prices, and the flurry subsided.

Colored cotton staple goods had a fairly active market over the course of the past week. The many dry goods wholesalers who were on hand found occasion to cover on seasonal requirements of a number of constructions, from napped constructions to piece dyes and yarn dyed weaves. The aggregate yardage total was attractive to various selling houses even if individual commitments may not always have been impressive, though various buyers covered on their normal requirements. Manufacturers also entered the market for cloth and their business added to that already sold over the course of recent weeks. On only a number of fabrics were mills uncomfortably sold ahead, the usual disposition among buyers being to operate with reasonable care. The result is that later on further covering operations may be expected to take up any additional production that may be at their disposal.

Sentiment in gray goods markets began to turn more cheerful the latter part of the week ending January 27th when cotton and burlap recovered some of the ground they lost since the beginning of the week. There was more bidding and some fair sized lots of a few constructions were sold. Prices, however, continued to linger at the levels at which the bulk of the past Friday's trading was done or about ¼c a yard under what they were at the beginning of the year. It was noticeable, however, that mills specializing in sheetings, drills, twills and similar goods were maintaining values. Osnaburgs were easier, but this was to be expected in view of the abrupt narrowing of the differential between these cloths and competing jute products.

Merchants are still unshaken in their belief that substantial business would have been booked this week were it not for the fact that the break in some commodities frightened buyers out of the market. Meanwhile, finished goods continue to move in fair volume, but trading is not as active as it ordinarily is at this time of year.

Cotton Yarn Markets

Philadelphia.—New business in cotton yarns has not increased materially in January. However, the average amount per order appears to have increased moderately. This seems to indicate that buyers have lately found prices more to their liking. Also, a good many yarn users probably have waited about as long as they can, and when they buy, are in the position of having to get possession quickly of yarn they ought to have arranged for before.

Most suppliers still seem satisfied to maintain their quotations. Since the middle of the month the weight of yarn, on the whole, probably has increased from the sales standpoint, while deliveries, though reduced as compared with December, are said by most observers to be satisfactory in the circumstances. At the same time, January sales and billings, thus far, are a disappointment to most of the dealers and spinners' agents here.

The substance of the current phase in yarn trading is that a majority of customers are justifiably conservative. They took care not to overbuy in the period last fall when incentives to excessive purchases were unusually strong. At the same time, yarn spinners and distributors took equal care not to overload their accounts with contracts which, this winter, might place on the spinners and their representatives the burden of forcing acceptance of deliveries.

There has been recently a more or less continuous easing-off in ordinary quality yarns. Occasionally this has also affected the better grade spinnings. This is chiefly the result of individual bargaining. In general, spinners and distributors remain loath to yield, knowing from experience that if the trend in this direction goes too far, they will compromise their chances of restoring their operattions to a profitable basis in the future.

It has to be recognized that a number of shrewd buyers, both weavers and knitters, are now putting down limited orders at prices which, a few weeks back, would not have been considered by the spinners.

Spinners waited a long time to enter a profit period and are doing all they can to prolong it. However, the marginal, short-term sellers are now handling most of the sales. The divisions in which prices are best maintained still have undersellers to contend with.

"THE NIGHT AFTER XMAS"

'Twas the night after Christmas, and boy, what a house!
I felt like the devil, and so did the spouse.
The eggnog and turkey and candy were swell
But ten hours later they sure gave me hell.

The stockings weren't hung by the chimney with care—
The darn things were sprawled on the back of a chair.
The children were nestled all snug in their bed,
But I had a large cake of ice on my head.

And when at last I dozed off in a nap
The ice woke me up when it fell in my lap.
Then for some unknown reason I wanted a drink,
So I started in feeling my way to the sink.

I got along fine till I stepped on the cat;
I don't recall just what occurred after that.
When I came to, the house was all flooded with light,
Although under the table, I was high as a kite.

While visions of sugar plums danced in my head
I somehow got up and then back into bed.
Then what to my wandering mind should appear,
But a miniature sleigh and eight tiny reindeer.

Then the sleigh seemed to change to a red fire truck,
And each reindeer turned into a bleary-eyed buck;
I knew in a moment it must be Old Nick—
I tried to cry out, but my tongue was too thick.

Then the old devil whistled and shouted with glee
While each buck pawed the earth and looked daggers at me.
Then he called them by name and the names made me shudder
When I heard them I felt like a ship minus rudder.

"Now Egg-nog! Bacardi! Four Roses! and Brandy!
Now Fruit Cake! Cold Turkey! Gin Rickey! and Candy!
To the top of his home, to the top of his skull,
Now whack away, crack away, with thumps that are dull!"

Then in a twinkling I felt on my roof
The prancing and pawing of each cloven hoof.
How long this went on I'm sure I can't say
Tho' it seemed an eternity, plus a long day.

But finally the night after Christmas had passed
And I found that I could really think straight at last,
So I thought of the New Year a few days away,
And I've made me a vow that no tempter can sway.

I'm sticking to water, don't even want ice,
For there's nothing as tasty or nothing as nice
The night after New Year may bother some guys
But I've learned my lesson, and brother I'm wise.

You can have your rich victuals, and liquor that's red,
But what goes to my stomach won't go to my head.
So a big Happy New Year to you and to all;
I'm back on the wagon, and hope I don't fall!
Author Unknown. (Reprint from *Cotton Trade Journal.*)

Woman Reveals How Cellulose Particles Form

Columbus, O.—Discovery of the way cellulose develops was disclosed recently to the American Association for the Advancement of Science.

Cellulose, taken from trees and plants, is used in a billion-dollar industry to make hundreds of articles ranging from rayon to explosives. How plants manufacture this major part of their structure has been one of science's great mysteries. The discovery is a step toward artificial creation of this great raw material by machines and chemical reactions.

The finding shows that the cellulose is manufactured in a round living factory so tiny that when magnified 4,500 times, it is no bigger than a 25-cent piece. This microscopical factory floats about in the living protoplasm inside the cells of plant tissues.

The discoverer is a woman scientist, Dr. Wanda K. Farr, famous as a botanist and noted in science circles for her good looks. She is dark and slender, the widowed mother of a grown son for whom she makes a home in Yonkers, N. Y. She is on the staff of the Boyce Thompson Institute for Plant Research, Yonkers, and her discovery was shown at the scientific exhibition here.

Cellulose is formed of tiny particles, which cement themselves together to form the walls of plant and tree cells. For years scientists have known that the cellulose particles appeared as if from nowhere in the living protoplasm inside these cells. But they were fully formed when first seen.

Dr. Farr got the clue to their source from examining a cucumber-shaped sea plant from Bermuda known as halicystis. Its cells are comparatively large.

She discovered the cellulose particles forming, in the shape of doughnuts, in tiny sacs calledplastids. These plastids both float in the cell protoplasm and are filled with protoplasm. The doughnuts first appeared in pairs, like two auto tires, side by side. Later chains of the doughnuts formed.

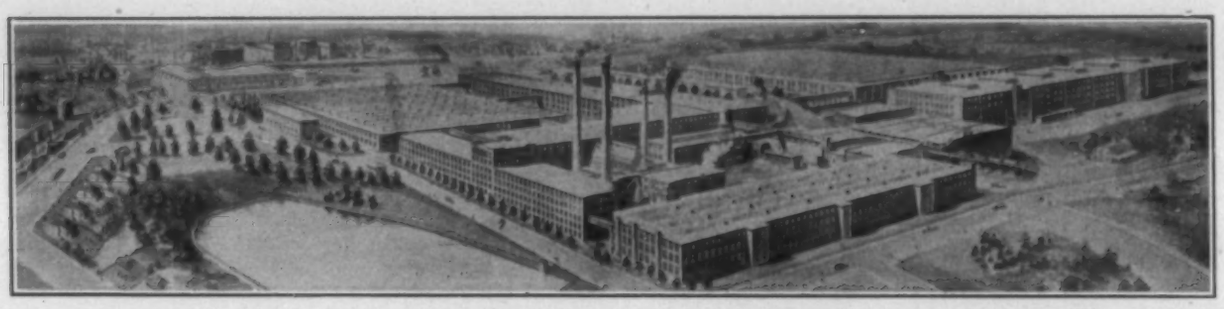
Finally the doughnuts broke into bits, and the plastid factory walls broke, releasing them into the main cell, the place where they had seemed to come from nowhere.

Dr. Farr said the reason this manufacturing place has escaped discovery was that the cellulose doughnuts were exactly the color of the protoplasm, and so remained invisible inside their plastid factories.

This origin of cellulose is closely linked with another of the great puzzles of science, which is how plants use sunlight, chlorophyll (their green coloring matter), air, and water to manufacture sugars and starches. The same little plastids that form cellulose also make some of them may make starch and cellulose at the same time.

Scientists have dreamed that if they could solve the puzzle of making sugar the way the plants do, they might produce food artificially.

A similar dazzling possibility for making cellulose now appears from Dr. Farr's work. The difficulties of discovering how nature does it are immense, however, because her factories are smaller than the point of a pin.



Visiting the Mills

Intimate Glimpses of Activities in Southern Textile Plants and the Men Who Own and Operate Them.

By Mrs. Ethel Thomas Dabbs (Aunt Becky)

GIBSONVILLE, N. C.

Minneola Mfg. Co. Among the Most Ideal Cotton Mills

There are newer mills and finer mills but there are none where a better or more co-operative spirit exists.

General Manager D. M. Davidson and Superintendent John Rountree have been here many years and probably know the names and ages of every man, woman and child in the village. And if there should be one they are not sure about, the bookkeeper and accountant, Harmon Randolph, can supply the information.

The "personal touch" means something here: sincere interest in the other fellow; genuine sympathy for the unfortunate and assistance where needed.

Misunderstandings and troubles melt away when talked over with Messrs. Davidson and Rountree, who are never too busy to listen and help solve any sort of a problem.

The overseers, too, are of the same high type and it is no wonder that the operatives are exceptionally fine people. Every employee received a fine Christmas bonus.

Old People Here Are Given a Chance To Be Independent

All honor to the mill or other industry that gives old people a chance. Minneola surely heads the list.

The two gate watchmen are B. L. Rogers, 76, and W. R. Shepherd, 78. Just let somebody try to slip something over on these two alert mill guards!

The overseer of carding and spinning, W. J. Jennings, has Lattie Brown, 78, sweeping in the spinning room and doing his work well. Dan Shepherd, 7 feet 3 inches tall, is roving hauler, and "lays it down" instead of up, as is the usual custom.

Overseer of Weaving R. K. Craven has the village pet, Aunt Mary Vorhees, 76, who weaves and makes $16 per week. W. D. Hammer, 80, is sweeper and Alex Stogner, 70, ties on warps.

One of the nicest and most modern eating places to be found is inside the mill, enclosed in glass walls and free from dust and lint. All kinds of soft drinks, milk, ice cream, cakes, sandwiches, etc., are served at far less than the usual prices. To "break even" is all that is wanted. Harmon Randolph "figgers the finance" and he must be a wizard manager. Three popular young ladies, one on each shift, keep things in beautiful order and give "service with a smile."

Community Activities

A community center, second to none in popular interest, is the Club House and Welfare Cottage, both in charge of competent leaders. The club house is mostly for men and boys, I believe, and the welfare cottage for women and girls.

Statistics for both places are interesting but space too limited for details.

Operatives all received a fine Christmas and they are still happy over it, and hope to do even better work for Minneola in 1940, if that is possible.

R. L. Seaford, overseer finishing, has a new floor in his department, which is one of the prettiest rooms in the mill. G. P. Younger is his live-wire assistant; R. C. Foster, second hand.

E. R. Gerringer is overseer packing and T. G. Evans is his able second hand.

J. D. Patton, dyer, is responsible for the many beautiful and fast colors of the pretty flannels or "outing." R. H. Yow, overseer slashing.

Others not mentioned above are Claude Stalnaker, in picker room; J. T. Childers, carder and spinner; J. M. Riley and C. L. Younger, second hands in carding; M. A. Kellis, doffer; Dwight L. Sutton and Jack Younger, color men; R. S. Scott, section in spinning; T. Freeman Clark, quill cleaner; C. L. Younger, second hand in carding; C. S. Hudgins, seeder fixer; Neal Troxler; O. W. Wyrick, lap fixer; J. Rigdon Wyrick, drawing; J. F. May, Lee Harris and W. E. Coffin, section men in spinning; Howard Shepherd and G. J. Yow, second hands in spinning; Clifton Underwood, roving; J. A. Rudisill, card stripper; G. P. Younger; Joe Ledbetter, beam dyeing; W. C. White, assistant overseer winding, warping and slashing; Lawson P. Wynn, sizing.

Others in weave room are W. J. Randolph and J. L. Pettigrew, genial second hand; T. D. Craven and Willie A. Boone; Fred Haney, Jesse Stewart and E. A. Evans, head loom fixers; D. Richard Hughes, warp man; E. G. Wall, tying in; John Wagoner, W. P. Killett and M. A. Beckom, loom fixers.

Now, if this is not a fine list of Textile Bulletin boosters, then we don't know beans.

TUXEDO, N. C.

Superintendent W. M. Melton and President and Treasurer Robert W. Boys, with some of the first bales of cotton from Mississippi Delta covered with cotton cloth and rope bands. This cotton arrived at Tuxedo, N. C., in September, 1938, and was used in Green River Cotton Mills, which makes fine combed yarns, gassed and mercerized, in their own local plant. Robert Erwin is assistant superintendent.

SHELBY, N. C.

Esther Mills Co. Undergoing Many Improvements

Shelby is one of the friendliest towns in the State. The court house, in the center of "The Square," is surrounded by a large shady lawn where seats invite the weary to rest. In summer, this is the most delightfully restful and inviting spot imaginable.

Esther Mill Co. is one of the city's several splendid mills, and has been making a number of inside improvements and installing equipment necessary for the production of fine rayon dress goods.

F. R. Abercrombie is the genial and well liked superintendent; J. F. Alexander and H. B. Alexander are in charge of carding and spinning; H. C. Pruitt, J. D. Mode and J. W. Hornbuckle, preparation; D. Trammell, W. P. Craig and G. H. Williams, weaving; Julian Waldrop, designer; J. F. McGaha, cloth room; J. R. Mullinax, master mechanic.

J. R. Dover, Jr., president, and Charles I. Dover, secretary and treasurer of three mills in Shelby, are among the most progressive young men in the textile industry.

SALISBURY, N. C.

Cannon Mills Co., Plant No. 7

This is the old Kesler Mill, located in Northeast Salisbury, and, like all other Cannon mills, has much to recommend it. Good machinery, good and understanding officials and overseers, and nice village homes.

L. Willett, superintendent, has been here 26 years, which proves his ability and efficiency. He is a thoroughbred gentleman—kind and courteous toward all, and, of course, a general favorite. E. L. Bolick, assistant superintendent, has a wonderful personality, is in love with his work, and bids fair to make a name for himself in the textile industry.

The overseers are the same high type, and the operatives co-operate with them for results—high grade sheeting, the famous Cannon brand.

C. A. Furr is overseer carding; T. B. Camp, overseer spinning; A. M. Whitmire, overseer weaving; R. D. Linn, overseer cloth room; C. L. Hill, master mechanic; H. S. Brandon, overseer yard and village.

Southern Sources of Supply

For Equipment, Parts, Material, Service

Following are the addresses of Southern plants, warehouses, offices, and representatives of manufacturers of textile equipment and supplies who advertise regularly in TEXTILE BULLETIN. We realize that operating executives are frequently in urgent need of information, service, equipment, parts and materials, and believe this guide will prove of real value to our subscribers.

AMERICAN CYANAMID & CHEMICAL CORP., 30 Rockefeller Plaza, New York City. Sou. Office and Warehouse, 822 W. Morehead St., Charlotte, N. C., Hugh Puckett, Southern Sales Mgr. Reps., John D. Hunter, C. B. Suttle, Jr., A. W. Foley, Charlotte Office; E. J. Adams, 1404 S. 22nd St., Birmingham, Ala.; Jack B. Button, 1202 W. Market St., Greensboro, N. C.; Eugene H. Driver, 272 14th St., N. E., Atlanta, Ga.; Wilton H. Earle, Jr., 409 Westfield Ave., Greenville, S. C.

AMERICAN MOISTENING CO., Providence, R. I. Sou. Plants, Charlotte, N. C., and Atlanta, Ga.

ARMSTRONG CORK CO. (Textile Division), Lancaster, Pa. Sou. Office, 33 Norwood Place, Greenville, S. C. J. V. Ashley.

ARNOLD, HOFFMAN & CO., Inc., Providence, R. I. Chester L. Eddy, Asst. Sales Mgr., 903-904 Woodside Bldg., Greenville, S. C. Sou. Reps., W. Chester Cobb, Box 1268, Charlotte, N. C.; Robert E. Buck, Box 904, Greenville, S. C.; Harold T. Buck, 1615 12th St., Columbus, Ga.; D. Floyd Burns, Jr., Box 198, Durham, N. C.

ASHWORTH BROS., Inc., Charlotte, N. C. Sou. Offices, 44-A Norwood Place, Greenville, S. C.; 215 Central Ave., S. W., Atlanta, Ga.; Texas Rep., Textile Supply Co., Dallas, Tex.

ATLANTA HARNESS & REED MFG. CO., Atlanta, Ga. Succeeded by Steel Heddle Mfg. Co., Atlanta Division. (See this company's listing.)

AUFFMORDT & CO., C. A., 2 Park Ave., New York City. Sou. Rep., S. L. Diggle, Jr., 522 Hawthorne Lane, Charlotte, N. C.

BANCROFT BELTING CO., Boston, Mass. Sou. Distributor, Carolina Supply Co., Greenville, S. C.

BARBER-COLMAN CO., Rockford, Ill. Sou. Office, 31 W. McBee Ave., Greenville, S. C., J. H. Spencer, Mgr.

BECCO SALES CORP., Buffalo, N. Y. Sou. Reps., J. D. Quern and D. S. Quern, 1930 Harris Road, Charlotte, N. C.

BORNE, SCRYMSER CO., 17 Battery Place, New York City. Sou. Mgr., H. L. Siever, P. O. Box 1169, Charlotte, N. C. Sales Reps., W. B. Uhler, 608 Palmetto St., Spartanburg, S. C.; R. C. Young, 1546 Stanford Place, Charlotte, N. C.; John Ferguson, P. O. Box 592, LaGrange, Ga.

BUTTERWORTH & SONS CO., H. W., Philadelphia, Pa. Sou. Rep., J. H. Zahn, Johnston Bldg., Charlotte, N. C.

CAROLINA REFRACTORIES CO., Hartsville, S. C.

CARTER TRAVELER CO., Gastonia, N. C.

CHARLOTTE CHEMICAL LABORATORIES, Inc., Charlotte, N. C.

CHARLOTTE LEATHER BELTING CO., Charlotte, N. C.

CIBA CO., Inc., Greenwich and Morton Sts., New York City. Sou. Offices and Warehouses, Charlotte, N. C.

CLINTON CO., Clinton, Iowa. Luther Knowles, Sou. Agt., Box 127, Phone 2-2486, Charlotte, N. C. Sou. Reps., Grady Gilbert, Box 342, Phone 1132, Concord, N. C.; Clinton Sales Co., Inc., Dana H. Alexander, 900 Woodside Bldg., Phone 3713, Greenville, S. C.; Geo. B. Moore, Box 481, Phone 822, Spartanburg, S. C.; Boyce L. Estes, Box 325, Phone 469, LaGrange, Ga. Stocks carried at Carolina Transfer & Storage Co., Charlotte, N. C.; Consolidated Brokerage Co., Greenville, S. C.; Bonded Service Warehouse, Atlanta, Ga.; Farmers Bonded Warehouse, Roanoke Rapids, N. C.

COMMERCIAL CREDIT CO., Baltimore, Md. Sou. Rep., C. T. Broun, Wilder Bldg., Charlotte, N. C.; E. L. Holloway, 101 Marietta St., Atlanta, Ga.

CORN PRODUCTS REFINING CO., 17 Battery Place, New York City. Corn Products Sales Co., Greenville, S. C.; John R. White, Mgr.; Corn Products Sales Co., Montgomery Bldg., Spartanburg, S. C., J. Canty Alexander, Asst. Sou. Mgr.; Corn Products Sales Co. (Mill and Paper Starch Div.), Hurt Bldg., Atlanta, Ga., C. G. Stover, Mgr.; Corn Products Sales Co., 824-25 Southeastern Bldg., Greensboro, N. C., W. R. Joyner, Mgr.; Corn Products Sales Co., Comer Bldg., Birmingham, Ala., L. H. Kelley, Mgr. Stocks carried at convenient points.

CUTLER, ROGER W., 141 Milk St., Boston, Mass. Sou. Office, Woodside Bldg., Greenville, S. C. Sou. Tape Agent: Byrd Miller, Woodside Bldg., Greenville, S. C. Roll Agents: Dixie Roller Shop, Rockingham, N. C.; A. J. Whittemore & Sons, Burlington, N. C.; Dixie Roll & Cot Co., Macon, Ga.; Morrow Roller Shop, Albemarle, N. C.; Greenville Roll & Leather Co., Greenville, S. C. Take Up Roll Agent: M. Bradford Hodges, Box 752, Atlanta, Ga.

DARY RING TRAVELER CO., Taunton, Mass. Sou. Rep., John E. Humphries, P. O. Box 843, Greenville, S. C.; Chas. L. Ashley, P. O. Box 720, Atlanta, Ga.; John H. O'Neill, P. O. Box 720, Atlanta, Ga. H. Reid Lockman, P. O. Box 515, Spartanburg, S. C.

DETERGENT PRODUCTS CO., 494 Spring St., N.W., Atlanta, Ga. Offices at: Columbia, S. C., Raleigh, N. C., Texarkana, Ark., Columbus, Ga.

DIEHL MFG. CO., Elizabethport, N. J. Textile Dept., P. N. Thorpe & Co., 267 Fifth Ave., New York City. Sou. Offices: Charlotte, N. C., 617 Johnston Bldg., James H. Lewis; Atlanta, Ga., 172 Trinity Ave., S. W., S. G. Boyd; Dallas, Tex., 2nd Unit Santa Fe Bldg., Olin Duff.

DILLARD PAPER CO., Greensboro, N. C., Greenville, S. C., Charlotte, N. C.

DRAKE CORP., Norfolk, Va.

DRAPER CORPORATION, Hopedale, Mass. Sou. Rep., E. N. Darrin, Vice-Pres. Sou. Offices and Warehouses, 242 Forsyth St., S. W., Atlanta, Ga., W. M. Mitchell; Spartanburg, S. C., Clare H. Draper, Jr.

DU PONT DE NEMOURS & CO., Inc., E. I., Organic Chemicals Dept., Dyestuffs and Fine Chemicals Div., Wilmington, Del. John L. Dabbs, Sou. Sales Mgr.; D. C. Newman, Asst. Sou. Sales Mgr.; J. D. Sandridge, Asst. Sou. Sales Mgr.; E. P. Davidson, Asst. Mgr. Technical. Sou. Warehouses, 414 S. Church St., Charlotte, N. C. Reps., C. H. Asbury, H. B. Constable, J. P. Franklin, J. F. Gardner, L. E. Green, M. D. Haney, W. R. Ivey, S. A. Pettus, A. W. Picken, N. R. Vieira, Charlotte Office; J. T. McGregor, Jr., James A. Kidd, 1035 Jefferson Standard Bldg., Greensboro, N. C.; John L. Dabbs, Jr., G. H. Boyd, 804 Provident Bldg., Chattanooga, Tenn.; R. D. Sloan, T. R. Johnson, Greenville, S. C.; W. F. Crayton, Adam Fisher, Jr., W. A. Howard, Columbus, Ga.; J. A. Franklin, Augusta, Ga.; Tom Taylor, Newnan, Ga.

DU PONT DE NEMOURS & CO., Inc., E. I., The R. & H. Chemicals Dept. Main Office, Wilmington, Del.; Charlotte Office, 414 S. Church St., LeRoy Kennette, Dist. Sales Mgr. Reps., J. L. Moore, Technical Man, Penn R. Lindsay, Salesman, 414 S. Church St.; N. P. Arnold, 1254 E. Lake Road, Atlanta, Ga., Technical Service Man; R. C. Cochrane, 356 Pine Tree Drive, Atlanta, Ga., Salesman; W. F. Murphy, 1106 19th Ave., Nashville, Tenn., Ceramic Salesman.

EATON, PAUL B., 213 Johnston Bldg., Charlotte, N. C.

EMMONS LOOM HARNESS CO., Lawrence, Mass. Sou. Plant, 118½ W. Fourth St., Charlotte, N. C. George Field, Mgr.; Clifton E. Watson, Mgr. Sou. Sales. Wm. S. Taylor, Supt. Charlotte Plant, Box 2036, Tel. 3-7503.

ENGINEERING SALES CO., 217 Builders' Bldg., Charlotte, N. C., S. R. and V. G. Brookshire.

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FOSTER MACHINE CO., Westfield, Mass. Sou. Offices, 1314 Johnston Bldg., Charlotte, N. C.

FRANKLIN MACHINE CO., 44 Cross St., Providence, R. I.

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H & B AMERICAN MACHINE CO., Pawtucket, R. I. Sou. Offices, 815 The Citizens and Southern National Bank Bldg., Atlanta, Ga., J. C. Martin, Agt.; Johnston Bldg., Charlotte, N. C., Elmer J. McVey, Mgr.; Fritz Zweifel, Fred Dickinson, Jim Miller, sales and service representatives.

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HOUGHTON WOOL CO., 253 Summer St., Phone Liberty 1875, Boston, Mass. Sou. Rep., Jas. E. Taylor, P .O. Box 2084, Phone 3-3692, Charlotte, N. C.

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JACKSON LUMBER CO., Lockhart, Ala.

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NATIONAL LEAD CO., Main Office, 111 Broadway, New York. Branches: 659 Freeman Ave., Cincinnati, O.; Widener Bldg., Philadelphia, Pa. (John T. Lewis & Bros. Co.); (Atlantic Branch), Georgia Lead Div., Atlanta, Ga. Warehouses: Savannah Bonded Warehouse & Transfer Co., Bay St. Extension and Canal St., Savannah, Ga.; John T. Lewis & Bros. Co., Pier 1, S. E. Corner Light and Pratt Sts., Baltimore, Md.; F. V. Gunn & Co., 1422 E. Cary St., Richmond, Va. Sou. Sales Reps., A. K. Brown, 1670 Cornell Road, N. E., Atlanta, Ga.; J. K. Campbell, Corner Jacksboro Pike and Oak Park Drive, Fountain City, Tenn.; Angus P. Gunn, 4011 Mt. Vernon St., Richmond, Va.; R. S. Hayes, 2305 Fourth Ave., Richmond, Va.; C. Wallace Jackson, 1709 Fort Bragg Road, Fayetteville, N. C.; T. B. Longhurst, 301 S. Union St., Concord, N. C.

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NATIONAL RING TRAVELER CO., 257 W. Exchange St., Providence, R. I. Sou. Office and Warehouse, 131 W. First St., Charlotte, N. C. Sou. Agt., L. E. Taylor, Charlotte, N. C. Sou. Reps., Otto Pratt, Union Mills, N. C.; H. P. Askew, Box 272, Atlanta, Ga.; Wm. S. Johnstone, P. O. Box 993, Gastonia, N. C.

NEW ENGLAND BOBBIN & SHUTTLE CO., Nashua, N. H.

N. Y. & N. J. LUBRICANT CO., 292 Madison Ave., New York City. Sou. Office, 1000 W. Morehead St., Phone 3-7191, Charlotte, N. C., Spartanburg, S. C., Atlanta, Ga., Greenville, S. C. Falls L. Thomason, Sou. Dist. Mgr.

NOBLE, ROY, New Bedford, Mass. Sou. Rep., John P. Batson, P. O. Box 514, Greenville, S. C.

NORLANDER MACHINE CO., New Bedford, Mass. Sou. Plant, 213 W. Long St., Gastonia, N. C.

NORMA-HOFFMANN BEARINGS CORP., Stamford, Conn. Sou. Rep., E. W. Lawrence, 1841 Plaza, Charlotte, N. C.

OLD DOMINION BOX CO., Lynchburg, Va. Factories at Lynchburg, Va., and Charlotte, N. C.

ONYX OIL & CHEMICAL CO., Jersey City, N. J. Sou. Reps., Edwin W. Klumph, 2018 Dilworth Road, West, Charlotte, N. C.; Cliff C. Myers, 2131 Charlotte Drive, Charlotte, N. C.

PABST SALES CO., 221 N. LaSalle St., Chicago, Ill. Sou. Rep., W. A. Pardue, Anderson, S. C. Sou. Warehouse, Textile Warehouse Co., Greenville, S. C.

PARKS-CRAMER CO., Plants at Fitchburg, Mass., and Charlotte, N. C. Atlanta Office, Bona Allen Bldg.

PENICK & FORD, LTD., Inc., 420 Lexington Ave., New York City; Cedar Rapids, Iowa; P. G. Wear, Sou. Sales Mgr., Atlanta, Ga.; W. J. Kirby, E. C. Kontz, J. H. Almand, Atlanta Office; C. T. Lassiter, Greensboro, N. C.; G. L. Morrison, Spartanburg, S. C.; T. H. Nelson, Charlotte, N. C.; W. R. Brown, Dallas, Tex. Stocks carried at convenient points.

PERKINS & SON, Inc., B. F., Holyoke, Mass.

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PROVIDENT LIFE & ACCIDENT INS. CO. (Group Accident and Health and Welfare Plans Div.), Chattanooga, Tenn. Southeastern Div. Office, 203 Commercial Bank Bldg., Gastonia, N. C.

PURE OIL CO., THE, Industrial Sales Dept., Southeastern Division Office, 140 Spring St., S. W., Atlanta, Ga., O. T. Clark, Mgr.

RHOADS, J. E. & SONS, 35 N. Sixth St., Philadelphia, Pa. Sou. Reps., L. H. Schwoebel, 513 N. Spring St., Winston-Salem, N. C.; J. W. Mitchell, Box 1589, Greenville, S. C.; A. S. Jay, 1600 S. 21st St., Birmingham, Ala.; J. T. Hoffman, 88 Forsyth St., S. W., Atlanta, Ga.; Atlanta Store, C. R. Mitchell, Mgr., 88 Forsyth St., S. W., Phone Walnut 5915, Atlanta, Ga.

ROY & SONS, B. S., Worcester, Mass. Sou. Office, Greenville, S. C., John R. Roy, Representative.

SACO-LOWELL SHOPS, 60 Batterymarch St., Boston, Mass. Sou. Office and Supply Depot, Charlotte, N. C., Walter W. Gayle, Sou. Agent; Atlanta, Ga., John L. Graves and Miles A. Comer, Selling Agents; Greenville, S. C., H. P. Worth, Selling Agent.

SEYDEL CHEMICAL CO., Jersey City, N. J. Sou. Rep., Harold P. Goller, Greenville, S. C.; Alexander W. Anderson, 10 Milton Ave., Edgewood, R. I.

SEYDEL-WOOLLEY & CO., 748 Rice St., N. W., Atlanta, Ga.

SLAYSMAN CO., THE, 813 E. Pratt St., Baltimore, Md.

SNAP-ON TOOLS CORP., Kenosha, Wis. 623 Spring St., N. W., Atlanta, Ga.; 20 E. 21st St., Baltimore, Md.; 2809 Main St., Dallas, Tex.; 119 W. Ashley St., Jacksonville, Fla.; 2516 Grand Ave., Kansas City, Mo.; 940 Poydras St., New Orleans, La.; 1645 W. Broad St., Richmond, Va.; 2647 Washington Blvd., St. Louis, Mo.

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1940 Census of Manufacturers Important To Textile Industry

(*Continued from Page 4*)

what incomplete nature of the reports, comparisons with current years are difficult to make. However, it is interesting to note that in 1810, in South Carolina, 6,513 "labour saving machines" were reported. These were 172 spinning jennies and 6,341 spindles. Families in the State made 3,083,188 yards of cotton goods, valued (50c per yard) at $1,541,594, and 72,636 yards of woolen goods valued at $58,108. Flaxen products, 690 yards, were worth $349 (50c per yard), while 2,000 yards of "flaxen and mixed goods" were returned as worth $1,050.

The four carding machines listed in South Carolina turned out 3,500 pounds of products valued at $350. Spinning wheels in operation numbered 5,334, while looms totalled 14,938.

In 1937, in South Carolina, according to the Census of Manufactures taken that year, were 137 factories with 74,693 workers (average number employed during the year) making cotton woven goods over 12 inches wide, one making narrow fabrics, and 26 with 6,309 employees making cotton thread and yarn. Total for the United States for factories making wide cotton goods was 677; 156 were making narrow goods, and 395 were producing cotton yarn and thread. Nine plants were turning out fish nets and seine, two being in Maryland and one in Missouri.

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